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F. R. Fosberg

Collection and Field Note Book	
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(May 29, 1950 - Oct. 2, 1950)	
(38135 - 38662)	
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Collection and Field Note Book

No. 47

(May 29, 1956 - Oct. 5, 1956)

(38135 - 38662)

RYUKYU ISLANDS

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Pub. by J. A. Ossen Company, Denver, Colo.

TUNDRA CURVES ON THE TRAIL RIDGE ROAD IN
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P222

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PLANTS OF THE RYUKYU ISLANDS

MIYAKO JIMA

Litsaea japonica (Thunb.) Mirbel

Locality

Occurrence

Date	1956	Alt.	m. (from map)
------	------	------	---------------

Coll. F.R. Fosberg	No.
--------------------	-----

Remarks

Pacific Vegetation Project

Plants collected by ^uK. Okazhara and K. Sunagawa
det. E.H. Walker unless otherwise
indicated

204
205
Sept. 30, 1956, Kurema ~~Island~~
Jima

- 1 Leucas
- (2)
- 3 Abutilon indicum (L.) Sweet
- 4 Kalanchoe pinnata (Lam.) Pers.
- 5 Panicum paludosum Roxb. det. EHW, OK, A. Chase
- 6 Breynia
- 7 Thuarea involuta (Forst.) R. & S. OK, A. Chase
- 8 Psychotria
- 9 Melicope awadan (Hatus.) Ohwi & Hatus.
- 10 Piper kadsura (Choisy) Ohwi
- 11 Erigeron canadensis L.
- 12 Gymnosporia diversifolia Maxim.
- 13 Kyllinga brevifolia Rottb.
- ✓ 14 Dactyloctenium aegyptium (L.) Beauv. OK, A. Chase
- 15 Cyperus rotundus L.
- 16 Wikstroemia retusa A. Gray
- 17 Urena lobata L. var.
- 18 Cassia tora L.
- 19 Ampelopsis brevipedunculata (var. maximowiczii
(Regel) Rehd.?)

- 20 *Leucaena glauca* (L.) Benth.
 21 *Echinochloa colonum* (L.) Link OK A. Chase
 22 *Verbena officinalis* L.

Oct. 3, 1956, ^{Tima} Irabu and ^{Tima} Shimoji Islands

- 23 *Cyperus rotundus* L.
 24 *Dactyloctenium aegyptium* (L.) Beauv. OK, A. Chase
 25 *Setaria viridis* (L.) Beauv. OK, A. Chase
 26 *Emilia sonchifolia* (L.) DC.
 27 *Corchorus acutangulus* Lam.
 28 *Portulaca oleracea* L.
 29 *Sophora tomentosa* L.
 30 *Euonymus japonicus* Thunb.
 31 *Abutilon indicum* (L.) Sweet
 32 *Smilax*
 33 *Leucaena glauca* (L.) Benth.
 34 *Phyllanthus*
 ✓ 35 *Sporobolus elongatus* L. OK, A. Chase
 ✓ 36 *Eleusine indica* (L.) Gaertn.f. OK, A. Chase
 37 *Ehretia microphylla* Lam.
 38 *Elaeagnus macrophylla* Thunb.?
 39 *Asclepias curassavica* L.? (sterile)

- 40 *Rhynchosia minima* (L.) DC.?
- 41 *Thuarea involuta* (Forst.) R. & S. OK A. Chase
- 42 *Euphorbia atoto* Forst.
- (43)
- 44 *Cassytha filiformis* L.
- 45 *Crepidiastrum lanceolatum* (Houtt.) Nakai
- 46 *Limonium arbusculum* (Maxim.) Makino
- 47 *Ficus erecta* Thunb.
- 48 *Gardenia jasminoides* var. *grandiflora* Nakai
- 49 *Lygodium microstachyum* var. *glabrescens* Nakai
- 50 *Breynia*
- 51 *Raphiolepis liukuensis* (Koidz.) Nakai
- 52 *Pittosporum tobira* (Willd.) Ait.
- (53)
- 54 *Vitex trifolia* var. *simplicifolia* Cham.
- 55 *Berchemia lineata* DC.
- (56)
- 57 *Pongamia pinnata* (L.) Merr.
- 58 *Sageretia theezans* (L.) Brongn.
- 59 *Melicope awadan* (Hatus.) Ohwi and Hatus.
- 60 *Nerium indicum* Mill.
- 61 *Calophyllum inophyllum* L.

62 *Euphorbia neriifolia* L.

63 *Tylophora tanakae* Maxim.

64

65 *Lespedeza striata* (Thunb.) H. & A.

66 *Zanthoxylum arnottianum* Maxim.

67 *Fimbristylis monostachya* (L.) Harms.
det J. H. Kern

68 *Leucas*

69 *Boehmeria nippononivea* var. *concolor* (Makino) Ohwi

70 *Lepidium virginicum* L.

71 *Artemisia* ?

72 *Vitis*?

73 *Physalis angulata* L. vel aff.

74 *Commelina auriculata* Bl. det F R F

75 *Oxalis corniculata* L.

76 *Cirsium* perhaps *C. brevicaule* A. Gray

77 *Urena lobata* L. var.

78 *Achiranthus mollicula* Nakai

79 *Ipomoea pes-caprae* (L.) Sweet

80 *Euphorbia hirta* L.

81 *Verbena officinalis* L.

82 *Premna obtusifolia* R. Br.

83 *Bruguiera conjugata* (L.) Merr.

84 *Youngia japonica* (L.) DC.

85 *Paederia chinensis* Hance

86 *Phyla nodiflora* (L.) Greene

87 *Fanicum paludosum* Roxb. OK A. Chase

87a *Solanum nigrum* L.

88 *Kalanchoe pinnata* (Lam.) Pers.

88a *Gymnosporia diversifolia* Maxim.

89 *Euphorbia heterophylla* L.

90 *Wikstroemia retusa* A. Gray

91 *Euphorbia atoto* Forst.

92 *Callicarpa japonica* Thunb.

93 *Scilla scilloides* (Lindl.) Druce

94 *Eccoilopus cotulifer* (Thunb.) A. Camus OK A. Chase

95 *Lactuca indica* ssp. *typica*

96

97 *Cyclosorus acuminatus* (Houtt.) Nakai

98 *Lysimachia mauritiana* Lam.

99

100 *Setaria lutescens* (Weigel) F.T. Hubb. OK, A. Chase

101 *Wedelia chinensis* Less.

102 *Digitaria sanguinalis* (L.) Scop. OK A. Chase

103 *Melochia corchorifolia* L.

104 *Imperata cylindrica* (L.) Beauv. OK A. Chase

105

~~106~~

106 *Zoisia tenuifolia* Willd. OK A. Chase

107 *Evolvulus alsinoides* L.

108 *Alysicarpus vaginalis* (L.) DC.

109 *Clerodendrum inerme* (L.) Gaertn.

Tima

Sept. 30, 1956 Kurema ~~Island~~

110 *Solanum verbascifolium* L.

111 *Bambusa*

112 *Croton cumingii* M.-A.

113 *Leptochloa panicea* (Retz.) Chwi OK A. Chase

114 *Paederia chinensis* Hance

115 *Euphorbia hirta* L.

116 *Antidesma pentandrum* var. *barbatum* (Presl) Merr.

117 *Hibiscus tiliaceus* L.

118 *Sporobolus elongatus* OK A. Chase

119 *Phyla nodiflora* (L.) Greene

120 *Cerbera manghas* L.

121 *Apluda mutica* L. OK A. Chase

122

123 *Bidens biternata* Merr. & Sherff

124 *Wedelia chinensis* (L.) DC.

- 125 *Sophora tomentosa* L.
- 126 *Nephrolepis biserrata* (Sw.) Schott
- 127 *Cyrtococcum patens* (L.) A. Camus OK A. Chase
- 128 *Emilia sonchifolia* (L.) DC.
- 129 *Cyclosorus acuminatus* (Houtt.) Nakai
- 130 *Setaria*
- 131 *Boehmeria nivea* (L.) Gaud.
- 132 *Ehretia microphylla* Lam.
- 133 ~~*Physalis angulata* L. vel aff.~~ *Pisonia aculeata* L.
sterile (spines straight, atypical)
- 134 *Physalis angulata* L. vel aff.
- 135 *Corchorus acutangulus* Lam.
- 136 *Rhynchosia minima* (L.) DC.
- 137 *Alternanthera sessilis* (L.) R.Br.
- 138 *Brachiaria subquadriparia* (Trin.) Hitchc. OK, A. Chase
- 139 *Lespedeza cuneata* G. Don
- 140 *Callicarpa japonica* Thunb.
- 141 *Raphiolepis liukuensis* (Koidz.) Nakai
- 142 *Commelina diffusa* Burm. det. FRF
- 143 *Jussiaea repens* L.
- 144 *Ficus retusa* var. *nitida* Thunb.
- 145 *Pittosporum tobira* (Willd.) Ait.
- 146 *Limonium arbusculum* (Maxim.) Makino

76 - 5 *Androsyllum*

75 - 5 *Clusia*

74 - 3 *Wikstroemia*

73 - 5 *Erythrina*

72 - 2 *Saccharum spontaneum*

71 - 3 *Pipturus*

70 - 4 *Clerodendrum*

69 - 3 *Saccharum spontaneum*

68 - 5 *Pterocarpus?*

67 - 5 *Firmiana*

66 - 3 *Diospyros ferrea*

65 - 3 *Vistulium*

64 - 2 *Croton*

63 - 3 *Ficus*

62 - 5 *Schefflera octophylla*

61 - 2 *Eucalyptus*

- 55 - 2 *Ten?*
54 - 3 *Arundo donax*
53 - 3 *Albizia*
52 - 5 *Piper*
51 - 2 *Xanthoxylum*
50 - 0
49 - 6 *Trupanea*
48 - 5 *Plex*
47 - 4 *Raphia*
46 - 5 *Korthalsella*
45 - 5 *Camellia*
44 - 4 *Dioscorea*
43 - 3 *Eupatorium pinnatum*
42 - 5 *Boehmeria*
41 - 4 *Andisia sieboldii*
40 - 4 *Psychotria*
39 - 5 *Ternstroemia*

60-2 *Quercus chambaziana*

59-2

58-3 *Morinda umbellata*

57-2 *Psychotria*

56-3 *Imperata cylindrica*

- 39 (5) *Ternstroemia* ~~sp.~~ *W. A.*
Tree, 15 ft. tall; suppressed in a pre-
dominantly Oak forest; elevation approx-
imately 600 ft.; mountain ridge 1 mile
S.S.W. of Kabira Village; very dark grayish
brown bark; fleshy fruit, pale green to
red colored; soil light colored, acid, sandy
loam, lithosolic, from granite.
Collected 11, August. 1956

- 40 *Psychotria*
Low tree, 10 ft. tall; part of understory of
forest predominantly Oak which is 40' to
50' tall; very dark gray bark; mountain
ridge approximately 600 ft. elevation,
1 mile S.S.W. of Kabira Village; berries
green colored; moderately deep, slightly
acid silt loam soil from diorite.
Collected 11, Aug. Locally abundant.

- 41 *Adiantum* ~~sp.~~ *Mig.*
Suppressed tree 20 ft. tall. Same site
as #40; bark light gray.
Collected 11, Aug.

42. *Boehmeria*
Spindly tree of understory; dense canopy
overhead at 30-35 ft.; head of steep narrow
draw; elevation approximately 550 ft.,
1 mile S. W. Kabira Village; moderately
deep acid, sandy loam soil.
Collected 11, Aug. Very abundant.

- 43 *Epipremnum* ^{(L.) Engl.} *pinnatum*. Collected from tree
trunk, 6 ft. from ground; same site as #42.
Collected 11, Aug. Abundant.

Specimens no. 44 through 49, collected 19,
Aug. from main ridge of Banna-dake 2-1/2
miles North of Ishigaki City; elevation
from 550 ft. to 650 ft.; soil moderately
deep, lithosolic acid silt loam from chert
and schist; vegetative type is low dense
forest 15-20 ft. tall.

- 44 ⁽⁴⁾ *Dioscorea* *cinchosa* Lam.
Vine, taken from top of 10 ft. tree; fruit green colored.
- 45 ⁽⁵⁾ *Camellia* *japonica* var. *hozanensis* (Hayata) Yamamoto
Tree codominant; 12 feet tall; very light grayish brown bark; fruit red colored; locally abundant.
- 46 ⁽⁵⁾ *Korthalsella* *opuntia* (Thunb.) Merr.
Mistletoe, collected from tree 10' tall.
- 47 ⁽⁴⁾ *Raphiolepis* *luliuensis* (Hilleb.) Nakai
Codominant tree 10 ft. tall; bark light brownish gray; berries green colored.
- 48 ⁽⁵⁾ *Ilex*
Dominant tree 12 ft. tall; bark brownish gray; berries green; abundant locally.
- 49 ⁽⁶⁾ *Turpinia* *ternata* Nakai
Codominant tree 10 ft. tall; bark dark brown; berries green..

Specimens number 50 thru 53 collected from near head of Miyara River, 2 miles West of Tozato Village; elevation approximately 300 feet; terrace soil, very deep, well developed silt loam over clay loam; acid. Collected 19, Aug.

- 50 Specimens missing.
- 51 ⁽²⁾ *Xanthoxylum*
Suppressed 12 foot tree; overhead canopy thick; 20 ft. in height; nearly level terrace; bark light brownish gray. Locally abundant. *Melicope* *suwadan* (Horn.) Chaisi
Kadsura (Ching) Chaisi
- 52 ⁽⁵⁾ *Piper* (?) Vine, slightly cordate leaves; collected from tree in a moist, shady draw.
- 53 ⁽⁵⁾ *Ophiorrhiza* *luliuensis* Hayata
Suffrutescent, 2-1/2 feet tall; dense overhead canopy; flowers white.
- 54 ⁽⁵⁾ *Arundo donax* L. OK A. *donax*
Giant reed (?) river bank; elevation 270 feet; open; wet, acid alluvial silt loam.
- 55 ⁽²⁾ *Itea* *barbosana* H. L. Li
Shrub 8 feet tall; sunny roadside; 1 mile N. W. of Kawahara Village; elevation 120 feet; deep slightly acid silt loam soil from impure limestone.

Specimens 56 through 61 collected from
foothills and lower mountain slopes
approximately 1 mile east of Shiramizu;
elevation from 300 to 400 feet; light
colored, well developed, shallow, acid, stony
sandy loam soil. Second growth forest with
irregular canopy from 10 feet to 40 feet.
Collected 19, Aug.

- 56 (3) ^{*cylindrica* (L.) Beauv. OK A. Chase} Imperata (?) Grass with flower; small opening on
rather large bench; no overhead canopy.
- 57 (2) ^{*Psychotria*} Tree, suppressed 6 ft. tall; dense overhead
canopy; berries yellowish green.
- 58 (3) ^{*Morinda umbellata* L. OK} Vine collected from tree; dense shade; green
berries.
- 59 (2) ^{*Illicium macrospatum* (Makino) A.C. Smith} Tree 10 feet tall; codominant; cup shaped
fruits; dark gray bark.
- 60 (2) ^{*Quercus thunbergii* *Castanopsis cuspidata* (Thunb.)} Castanopsis (?) Dominant tree 25 feet tall; light
gray bark; common.
- 61 (2) ^{*Euonymus*} Small dominant 10 feet tree; berries black;
locally abundant. ^{*Euscaphis japonica* (Thunb.) Kuntz}

Specimens 62 through 67 collected on Yarabu-
dake and vicinity 1 September. Moderately
deep, heavy, loamy, dark colored surface soil
over red clay, latosolic, acid, on basic
volcanics. Cut-over forest 30-50 feet canopy.

- 62 (5) ^{*octophylla* (Lam.) Harms OK} Schefflera, codominant 35 feet tree; 40%
northern slope; elevation 360 feet; very
light gray bark; locally abundant.
- 63 (3) ^{*Ficus*} Small, 6 foot, spindly, suppressed tree;
canopy at 40 ft; broad ridge top; elevation
430 feet; berries light greenish yellow;
bark very dark brown.

- 64 (2) *Croton Cunninghamii* M. & A.
Small shrub; 3 feet; dense overhead canopy; broad ridge; pistils white; elevation 430 feet; very abundant locally.
- 65 (2) *Distylium racemosum* S. & Z.
Tree dominant, 20 feet tall at summit of Yarabu-dake; shallow lithosolic acid loam; fruits brown; slightly tomentose; elevation 630 feet.
- 66 (3) *Diospyros ferrea* var. *lucifolia* (R. H. B.) Bakhuisen
Tree dominant, 20 feet tall; berries chiefly yellow, some red to very dark red; same site as #65.
- 67 (5) *Firmiana simplex* var. *glabra* Hatusiana
Firmiana, 20 feet tall; dominant; just below summit of Yarabudake; soil as #64; slope 50%; elevation 600 feet.
- 68 (5) *Pterocarpus* (?) *Pongamia pinnata* (L.) Merr.
Pterocarpus, dominant; 40 feet tall; 1/2 mile N. W. of Yarabu school; gentle slope at foot of mountain; acid silt loam soil derived from schist; bark white; 3 very large trees of this species and several smaller sprouts; very little foliage; elevation 100 feet.
- 69 (5) *Saccharum spontaneum* L. OR A. Chase
Miscanthus, Nagura area, 1 mile S. S. E. of Bailey bridge over Nagura River; Shioya soil; elevation 10 feet; most of area in Imperata. Sept. 9.
- 70 (4) *Clerodendrum trichotomum* Thunb.
Dominant tree, 15 feet tall, 1/2 mile E. of Nagura school; roadside; deep well developed terrace soil, acid; flowers white to purplish, fragrant; bark pale grayish brown. Sept. 9, 1956
- 71 (3) *Pipturus arboreus* (Link.) C. B. Rob.
Morus, sunny roadside 200 feet west of Yaeyama Agricultural Experimental Station; deep sandy loam soil, slightly acid from impure limestone; elevation 110 feet; bark brown; fruit green. Sept. 9

Saccharum spontaneum L. OK A. Clark
72 (2) *Miscanthus*, 1/4 mile west of Shiraho Village;
very shallow, rocky, heavy alkaline clay between
limestone outcrops; open grazed area 10-
15 feet above sea level. Sept. 9.

Erythrina variegata var. *orientalis* (L.) Murr.
73 (5) *Erythrina*, 25 feet tall, 300 yards S. E. of
Miyara River bridge; roadside; Shioya loamy
sand. Sept. 9.

Wilstroemia retusa A. Gray
74 (3) Low suffrutescent; same site as #72; corolla,
greenish yellow; pistils orange. Sept. 9.

Celtis *forficata* Koidz.
75 (5) *Celtis*, Ishigaki City, main street, 1/2 mile
west of downtown area; specimen 60 feet tall;
Shioya soil. Sept. 10.

76 (5) *Xanthoxylum*, 1/2 mile north of Shiramizu;
elevation 60 feet; deep acid, sandy loam
colluvium; partly open stream bank.
Collected Sept. 11.

Fouquieria aplanthoides (S. + Z.) Engelm.

F 11
110

F. R. Fosberg
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38135, ending with
38662

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2

1954 Ryukyu Is

May 29 - West bank of
Miyama Gawa.

7 1 Rhododendron

Helen Foster

8 2 Lycopodium cernuum L.

Seturo Yamazato

May 30

2 3 Eugenia jambos
solitary in valley bottom
S. Yamazato

May 31 3/4 mi. s.w. of Banuma

4 Psidium guajava

S Yamazato

Ishigaki

3

200 m.

small tree; flowers
a rich crimson.

200 m.

100 m.

tree, "hii-do", fruit edible.

"Bamshumi" fruit eaten

4 1956 Ryukyu Is.

5 *Oryza sativa* var.
grown in deep water,)
one crop a year

behind Sonai

Helen L. Foster

Yonaguni Shima 5

said to be a variety
peculiar to Yonaguni,
not as productive nor
as good as ordinary
varieties.

June 1956

- 3 6 *Gardenia* ~~sp.~~ *sp.*
3 km. n.e. of Nosoko
along stream ~~is~~ among
other trees.

Coll. S. Yamazaki

July ↓ 1956

- 5 7 *Antidesma* ~~sp.~~ *sp.*
in secondary forest
at waterfall between
Yonohara and Yoshikawa
Coll. S. Shibayama

- 2 8 *Sansevieria*
Hirai

Coll. H. Tachikawa

- 3 9 *Ilex* ~~sp.~~ *sp.*
near Kainan Village
in dense forest

- 3 10 *Jasminum* ~~sp.~~ *sp.* (L.) Ait.
Hirai

- 3 11 *Antidesma* ~~sp.~~ *sp.*
near Kainan Village
in dense forest

- 3 12 *Hyptis* ~~sp.~~ *sp.*
rice field (no locality)

- 5 13 *Acacia confusa* Mon.
Experimental Farm,
north of Shiga City

AND

tree

vine twining in tree.

erect, mottled; flowers
whitish.

8 1956 Ryukyu Is.
collections by R.J. Davis

April - 1.1-1.2 mi. west of
Ibaruma
on mountain side, with
shallow, acid, latosolic silt loam
soil.

17 *Andropogon* *seiboldii* 12-9

18 *Ficus* *virgata* 12-9
on exposed road bank

19 *Albizia* *strobilifera* 12-9
dominant

20 *Psychotria*

21 *Andropogon* *peruviana* 12-9
moist shady draw

22 *Laurencia* *triquetralis* 12-9
moist shady draw

23

April - 1.4 mi. west of Ibaruma
same

24 *Psychotria*

25 *Andropogon* *seiboldii* 12-9

26 *Stemodia* *pusilla* 12-9

27 *Caribaea* *monghai*

28 *Mallotus* *philippensis* 12-9

Ishigaki

16 *Acacia* *confusa* 9

Waterworks

planted along road
small tree, flowers yellow.

250'

↓

tree 20 ft. tall, with smooth
brownish gray bark.
shrub-like; berries red

tree 25 ft. tall

tree 15 ft. tall, bark dark
grayish brown.

270' "spindle-like" suppressed
tree, 10 ft. tall

~~tree 10 ft. tall~~ tree 10 ft. tall
~~tree~~ bark very dark gray.
small tree or shrub, bark
mottled light and dark gray

270'

understory tree 10 ft. tall,
bark very dark brown, smooth.

Tree 20 ft. tall

climbing vine with yellow
flowers.

tree 20 ft. tall, sap milky.

tree 15 ft. tall, fruit orange,
pubescent.

1956 Ryukyu Is.
Collections by R. J. Davis

April - 2 miles east of Yoshikawa
on deep slightly acid sandy
loam soil on sloping terrace

29 *Clusia indica* May
in 25 foot forest

30 *Psychotria*
in 25 foot forest

31 *Tillandsia crinitata* B.
in 25 foot forest

32 *Psychotria* (L.) H. B.
in 25 foot forest

33

May 30 - head of Nagura Valley
in secondary thicket
in ravine on terrace
on moist loamy sand.

34

33 *Styax japonica* var. *iriosakana* Masam.

34 *Euscaphis japonica* (Thunb.) Kuntz.

35 *Schinus molle* Nakai

May 30 head of Nagura River

36 *Sarcandra glabra* (Thunb.) Nakai
moist shady stream bank

37 *Ilex formosensis* H. L. Li
shady creek bottom

38 June 13

open edge of field, in heavy shade

38 *Lysimachia zibuliana* May

(continued in pocket on front cover)

understory shrub

understory shrub.

tree 15 ft. tall

tree 20 ft. tall (mature
flowers from different
individuals)

60 ft.

tree 15 ft. tall, bark mottled
gray and brown.

tree 15 ft. tall, bark smooth,
mottled dark and light gray.

tree 25 ft. tall, flower
with white corolla and
yellow pistils.

~~tree~~

suffrutescent, 5 ft. tall.

20 ft.

300 ft. suffrutescent, 3 ft. tall.

slightly alkaline soil.

30 ft.

low annual with yellow
flowers.

Aug. 8. Forested area north
of Karimata

Shrine grove is mostly
garcinia, some Cycas,
Porteria, Diospyros, etc.
This is in a beach forest
area. The surrounding
littoral forest is largely
Pandanus with Ardisia,
Hernandia, Rappirolepis,
Hibiscus tiliaceus, etc.
Pisonia, etc.

Aug. 8 - Forested area
just back of beach
north of Karimata

38135
5 *Garcinia spicata* Hook. f.
dominant in grove around
shrine on sand

6 36 *Porteria ~~ferruginea~~*
common in littoral forest

3 37 *Casuarina ~~retusa~~*
common in littoral forest

2 38 *Rappirolepis ~~bulbosus~~*
common in littoral forest.

5 39 *Pittosporum tobira* (Willd.) Ait.
occasional just back of beach

6 40 *Tournefortia ~~torreyana~~*
occasional in lowland
forest on limestone

41 *Ardisia ~~subcordata~~*
~~very~~ very common on
limestone in forest

The forest on limestone
is largely *Diospyros*
nakitama, *Ardisia*,
~~etc.~~ *Garcinia*, etc.

2m. large old trees 3-4 dm.
dbh., spreading.

fruits on ground yellow,
those still on trees green.

" - small tree 6 m. tall,
fruit green to black.

" - shrub 1.5 m. tall;
young buds only.

" - small tree, fruit
just turning reddish.

" - shrub 2 m. tall,
fruit green.

4m. - shrub 2 m. tall,
fruit immature

"

- 38192 *Psychotria linkinensis*
occasional in forest on
limestone
- 1 43 ~~*Psychotria linkinensis*~~ ^{*Psychotria linkinensis*}
occasional in scrubby
forest on limestone
- 5 44 *Aristolochia* ^{*linkinensis*}
occasional in scrubby
forest on limestone
- 5 45 ~~(add)~~ ^{*Psychotria linkinensis*}
occasional in scrubby
forest on limestone
- 3 46 ~~(add)~~ ^{*Scaevola taccada*}
locally common back
of beach in low scrub

Aug. 9. - Sugama
thickets between fields,
along small ravines,
around small ponds.

Andisia
Garcinia
Musa
Arenga
Ficus calusa
Melina
Thespesia
Morus
~~*Acacia*~~
Boehmeria
Machilus
Podocarpus
Livistona
Diospyros ferex

4 m.



- shrub, flowers pale
greenish.
- twining vine, fruit
immature.
- twining vine; fruit
immature.
- twining vine; flowers
pale green; fruit immature
- ~~shrub~~ low shrub, sterile.

Calophyllum
Celtis??
Conamomum?
Munaya
Miscanthus
small bamboo
Cynelina (*C. tsuyugusa*)
Leucaena
~~*Macaranga*~~
Arundo donax

mostly cultivated
patches, separated by
low stone walls
with bushy hedges,
or by grassy banks.
Wet places have taro,
dry sugar cane and sweet potatoes.

Aug. 9 - Yonaha Wan
~~west~~ side near Yonaha
 lined with low rough
 limestone with scrub
 growth, largely *Excoecaria*,
 badly browned by typhoon
 some sparse mangroves
Randelia, principally.

a few *Pandanus*.

on rocks near h.t. level
Limonium, *Paspalum*
vaginatium, *Lepturus*,

The *Excoecaria* jungle
 also contains *Clodendrum*,
Hibiscus, *Pongamia*,
Cannons, etc.

Back of it is hedgerows
 of *Ficus retusa*, *Pongamia*, etc.
Andisia, etc.

Aug. 9 - Yonaha, ~~west~~ west
 shore of Yonaha Wan
 in low scrub on rough limestone

38147 *Ampelopsis* ~~common~~
 5 common

5 48 *Pouteria ferruginea*
 occasional

5 49 *Excoecaria agallocha* L.
 abundant, dominant

Aug. 9 - between Hirara
 and Kaamichi
 the uplands are largely
 cultivated in small
 patches, principally
 sugar cane and sweet
 potatoes; the patches
 are frequently separated
 by low stone walls
 covered by brush, or by
 irregular rows of
 small *Acacia confusa*,
 or *Cassia* sp., or by *Agave*,
Erythrina trees, or by
 grassy banks. There
 are patches of rocky
 ground with *Pandanus*
 or mixed grass and
Pandanus, and small
 plantings of *Casuarina*,
Calophyllum or *Pinus*.

1-2 m.

vine climbing in
 bushes; flowers pale
 greenish, fruit purple.
 shrub 2 m. tall, lactiferous.

shrub 2.5 m. tall, mostly
 defoliated ^{in typhoon} leafy twig
 from different plant, not
 much less exposed than
 leafless ones).

Aug. 9 - Sugama
in thickets mixed with
cultivated patches

38150 *Eunonymus japonicus* Thunb.
occasional

51 ~~(Hemlock)~~ *Abies* ~~(Hemlock)~~
abundant

52 *Commelina diffusa* Burm.
occasional on edges of
cultivation

53 *Wedelia*
on grassy banks

54 *Thespesia populnea* (L.) Sol. ex
common cornea

55 *Cinnamomum japonicum*
common

56 *Zephyranthes candida* (Lindl.) Herb.
uncommon, edge of
wet place.

57 *Polygonum*
edge of wet place

58 *Diospyros persea*
common

59 *Andisia*
common

5 m.
↓

shrub 2 m. tall,
flowers greenish.

forming rather close
small clumps, culms
erect, green, yellow when
completely mature, sterile.
decumbent, flowers
blue-lavender, 3 petals
equal.

decumbent, flowers
yellow.

small tree

shrub 2 m. tall,
somewhat fragrant
when crushed.
flowers white.

flowers white

small tree, 4 m. tall,
dark green, fruits
orange, edible.

small tree 3 m. tall,
branches articulated;
flowers pinkish white;
fruits globose immature.

Aug. 9 - head of lake
west of Kubakawa
muddy shore mixed
with rough limestone
boulders and outcrops.
Narrow fringe of mangrove,
mainly *Bruguiera*
exocarpis, *Kandelia*, etc.
with some grass,
probably *Sporobolus*
virginicus.

In places *Kandelia*, in
places *Bruguiera* forms
a belt on the portion
exposed by low tide ^{about 2 m.}

The substratum here
is generally rather
firm, ~~the~~ clay with
considerable broken
finger-like coral
and mostly ^{about 2 m.} probably
rather shallow, on
limestone base.

In places, especially
where crabs have
dug it up, it is soft
and sticky.

Back of the muddy
belt is another which
is firmer and covered
by *Exocarpis* and *Pandanus*.
The rough boulders
have a community
of *Limonium*, *Scaevola*.

Carmona etc. on
larger ones, *Ficus* etc.
on thickets back of mangrove
of *Pandanus*, *Derris trifoliata*,
Miscanthus, etc.

Aug. 9.

(1)
photo (4-4)

Swamp grass, probably
Miscanthus sinensis,
rather pure stand,
1-2 m. tall.

Pandanus toward
sea.
Rock is apparently
close to surface
in some spots showing through.

On shores of little bay
below tops of rough
limestone cliffs covered
by *Pandanus* thicket,
rocks below have
patches of *Limonium*
arbusculum, *Ischaemum* sp.
Scaevola, *Messerschmidia*
Pemphis (last 4 up rather
high), *Indigofera* *linbiensis*,
silvery leaved prostrate legume.

away from sea Miscanthus
gives way to patches of
cultivation, patches of
Miscanthus, Pandanus,
small groups of Cycas,
limestone outcrops with
Ficus, Miscanthus, Cycas,
Pisonia, ~~etc.~~ Toddalia, etc.
All much browsed by the
typhoon except Pandanus

Aug. 9 - north side of
Kubakawa tidal lake
narrow mangrove belt

- 38160 *Lygodium* ^{var. *reticulatum* (L.) Presl}
common in thicket at edge of
1 61 *Callicarpa* ^{Jap. var. *Thunbergii*}
rare in thicket at edge of
6 62 *Kandelia kandel* (L.) Merr.
dominant in most of
3 63 *Pemphis acidula* Forst. f.
rare on limestone in
edge of
5 64 *Bruguiera conjugata* (L.) Merr.
very common in
5 65 *Pandanus tectorius* var.
very common in thicket back of
5 66 *Ficus retusa* ^{var. *Thunbergii*}
on rough limestone
boulders in edge of
3 67 *Ficus erecta* var. *blechnifera*
occasional in thicket on edge of
5 68 *Phyllanthus*
edge of cultivated ground
outside of

Aug. 9 - 2 km. east of Hirara
Rolling grassland with
very little Pandanus,
on Miyako clay loam.
A trailing *Barbus*, occasional
Toddalia and some
small Camphor bushes
probably planted.

0-1 m.

fronds twining in bushes.

low shrub, flowers
lavender.

shrub 1.5 m. tall,
flowers white
erect shrub 3 m. tall,
flowers white.

shrub 1.5 m. tall, ^{leaves} ^{very} ^{shiny}
calyx red, ^{very} ^{shiny}
shrub 2.5 m. tall, fruiting head
range red, oval, base of phloem swollen
shrub, roots forming
network over boulders,
fruit dull pink.
shrub 0.3 m. tall, fruit
not quite mature

24

1956 Ryukyu Is.

- 38/69 *Verbena officinalis* L.
edge of cultivated field near
- 5 70 (~~asanth.~~) *Justicia*
edge of path into
- 5 71 Aug. 9 southwest of Tananifu
Nephrolepis exaltata
walls of excavation in
limestone
- 2 72 *Oxalis corniculata* L.
on bare ground along
trail in limestone soil
- 5 73 *Malvastrum coromandelianum*
^{(Ait.) A. Gray}
on bare ground along
trail in limestone soil
- 2 74 *Cyperus rotundus* L.
rare on bare ground
- 5 75 ~~asclaf.~~ *Passiflora amurica* A. DC.
occasional in thicket on
limestone
- 2 76 *Hedyotis albido-punctata*
common on rough ^{(Merr.) Fock.}
limestone just above
high tide level
- 1 77 *Cocculus trilobus* (Thunb.) DC.
rare on rough limestone
- 4 78 *Cassytha filiformis* L.
common in various
shrubs on limestone

Mayako I.

25

2m.

flowers lavender

2m.

flowers lavender

10m.

↓

fronds ascending
to erect.

flower yellow

much branched
depressed herb.
flowers pale dull
yellowtwining vine, flowers
pale green.

3m.

twiner, fruit turning blue

5m.

10m.

stems green, flowers
and fruit white.

Aug. 10 - shrine south
of Sugama
grove consisting of
Casuarina
Garcinia
~~*Calophyllum*~~
Ficus retusa
Podocarpus
Persea?
Pinus
Some trees rather large
but grove much more
open than usual.

Aug. 11 Kasechiya
coast of deeply eroded
and pitted hard limestone
Edges rather bare with
Limnium, *Leacola*, *Carmona*,
Pemphis, *Angelica*, *Ischaemum*,
Zoysia tenuifolia, *Ipomoea*
pes-caprae, *Aparagus*, *Indigofera*
Back of this a wide
belt of *Pandanus* scrub.
Casuarina here appears
dead.

Aug. 11 Munai
Large irregular
grassy area is *Miscanthus*
and some *Imperata* -
looks like what would
be "rock-pasture" in Ishigaki
but not or scarcely

grazed. The stand of
grass is dense, of uneven
height, depending on
whether *Miscanthus*,
Imperata, or *Panicum*
repens is dominant and
whether there has been
recent cutting.

Locally *Pandanus*
Cycads, and other shrubs
are as abundant as
the grass. These mark
exposures of rock.
Thelypteris and
Lygodium are very
frequent, also *Mollis*
Yapuncus, *Toddalia*,
Ficus erecta, *Callicarpa*,
Morus, *Hibiscus tiliaceus*,
Boehmeria sp. *Carmona*,
Dianella, *Psidium*,
Eupatorium, *Lippia*, *Wedelia*
chunensis?, *Rubus*
locally scattered small pines

The soil filling the pockets
is gray-brown to chocolate
brown, fine, with
some limestone gravel.

1956

Aug. 10 - MCAT, 1 km. s. of
Hirara

38179

3

Gardenia jasminodes var. *grandiflora*
planted on compound (what
seems to be same seen wild)

Aug. 10 - Minaai
in rocky grassland with
shrubs

3

80

Callicarpa japonica Thunb.
occasional

3

81

Thelypteris
very common

4

82

Clematis *lanceolata* Maxim.
occasional

2

83

Aug. 10 - ^{southwest of} Kanechizyo
Paederia
back of littoral thicket

2

84

Indigofera linkeensis Makino
occasional on open
pitted limestone just
back of high tide level

Aug. 10 - 0.5 km. s. of Sugama
in patch of thin woods
around shrine

3

85

~~*Rosa*~~ *Michelia* *thunbergii* Thunb.

3

86

Morus australis Poir. var. *glabra*

2

87

Digitaria
Digitaria subquadrifida (L.) Hilleb.

40 m.

shrub 1.5 m. tall; flowers
white, turning cream,
very fragrant.

5 m.

low shrub, flowers
pinkish lavender
all seen sterile, stigmas
slightly buried.
climber

5 m.

prostrate, foetid, sterile.

prostrate from
tough root crown.

5 m.

sterile tree leaves glaucous beneath,
small shrub, defoliated
by typhoon; "kuwanoki" (1)
prostrate

- Aug. 10 - limestone ridge
east of Hirara
Low vegetation - sword grass
and scrub mixed
- p *Acacia confusa* (scattered 1-2 m)
 - c *Psidium*
 - c *Mallotus japonicus*
 - c *"Bredynia"*
 - a low spiny *Rosacea*
 - c *Toddalia asiatica*
 - a *Nephrolepis exaltata*
 - c *Ficus erecta*
 - a *Miscanthus*
 - Scleria* sp.
 - b *Gardenia*
 - c *Ardisia*
 - c *Cinnamomum*
 - c *Pandanus*
 - o *Smilax* sp.
 - c apoc. vine. (shiny lvs.)
 - o *Ficus virgata*
 - Ficus retusa*
 - o *Wikstroemia*
 - b *Pouteria*
 - ~ *Elaeagnus*
 - lc *Raphiolepis*
 - i *Camellia*
 - lc *Pittosporum*
 - o *Lespedeza cuneata*
 - ~ *Morus*
 - lo *Lycium machia mauritiana*
 - lo *Eucalyptus*
 - ~ *Rosa ? Machilis ?*
 - lc *Thelypteris*
 - Hibiscus tiliaceus*

In places *Pandanus*
is abundant. In places
small plantings of
Casuarina or *Calophyllum*

Aug. 10 - east of second
main ridge east of
Hirara

Here is an extensive
grassland on Miyako
clay loam soil

It is mostly *Panicum*
with occasional
admixture of *Imperata*,
a few clumps of *Miscanthus*.
Much of it has been
planted to seedlings
of pine, *Casuarina*, *Camphor*,
etc. In places there
are 1 m. tall, esp. the
Casuarina, locally 2-3 m.,
mostly rather sparse
stand.

Panicum repens ("Hayakibi")
This grass has a thick knotty
very deeply buried rhizome.

- Aug. 10 - MCAT, 1 km. ^{2. of} Hirara
 38188 *Morus australis* Poir.
 5 planted around dwellings
 3 89 *Pilea microphylla* Liebm.
 common in edge of lawn

- Aug. 10 4.5 km. e. of Hirara
 s. of Onoyama
 in open rolling grassland
 on Miyako's clay loam soil (acid)
 8 90 *Panicum* ^{sp.}
 dominant
 1 91 *Letaria* ^{sp.}
 rare

- Aug. 10 2.3 km. e.s.e. of Hirara
 north of Yaabari
 on low limestone ridge
 with scattered brush
 5 92 *Letaria* ^{sp.}
 common at edges of cultivated
 patches
 1 93 *Ernia sonchifolia* (L.) DC.
 infrequent at edges of
 cultivated patches
 6 94 *Nephrolepis cordifolia* (L.) Presl
 abundant on stone
 walls and outcrops
 2 95 *Dichondra*
 on open almost bare ground
 1 96 *Cyperus* ~~sp.~~
 occasional in grassy spot
 1 97 *Polygala*
 rare in grassy spot
 2 98 *Hibiscus tiliaceus* L.
 common in bushy patches

40 m.

↓

100

40 m.

↓

40-50 m.

↓

100

100

flowers purple,
 slightly exceeding involucre.

fronds erect.

forming a thin mat;
 sterile!

100

shrub 1.5 m. tall
 flower yellow, maroon center.

- 38199 *Fimbristylis* ^(L.) ~~discolor~~ ^{Michx.}
occasional in grassy place
- 38200 *Youngia japonica* (L.) DC.
occasional in protected
grassy place
- 5 01 *Raphiolepis* ^(L.) ~~discolor~~ ^{Michx.}
common in low scrub
- 6 02 *Ficus virgata* Reinw.
rare on ^{rough} limestone ~~ledge~~
- 2 03 *Gardenia* ^{jasminoides}
occasional
- 5 04 *Phyllanthus*
^{Parsonsii}

Aug. 11 - 1/2 mi. w. of Nagasaki

limestone knolls covered
by scrub forest.

Morus australis

Melia azederach

Pandanus

Melastoma (glaucescens)

Cardinalis

Ficus virgata

Melanolepis?

Ficus retusa

Cinnamomum

Ficus erecta

Eurotia

Gardenia

Macaranga

Pterocarpus?

Diospyros maritima

div J H

Kern

shrub 1 m. tall;
fruit immature

shrub 1.5 m. tall,
fruit ^{mostly} immature,
reddish green when ripe.

shrub 1 m. tall, fruit
immature.

Porteria

Asplenium nidus

Flagellaria indica

Croton

Smilax

Psychotria

This is a ragged
degraded scrub forest
apparently continuously
cut over for firewood.

Aug. 11

near. east end

Fantastic landscape of rough limestone knobs and pinnacles, partly bare but largely covered by a low scrub of *Rapanea*, *Carronia*, *Cycas*, *Ficus retusa*, *Portulaca*, *Pandanus*, *Ficus erecta*, *Croton*, *Sedum*, *Osteomeles*, especially the low spiny *rosaceae*.

at the top of the seaward cliff, and for a few m. back is a dense mat of *Osteomeles* and the spiny *rosaceae* spreading over the back slopes of the rim of the island.

The intervals are filled by *Imperata*, *Zizania* or *Sporobolus*, and small cultivated patches. *Dianella* forms small patches.

Near the cliff edge some of the other common shrubs, as *Croton*, *Ficus retusa*, as well as *Crinum*

are mixed with the *Osteomeles* mat.

Down at the base of the cliff, is a talus of giant boulders covered by a mixture of *Miscanthus* and *Pandanus*, with a few *Cycads*, some other shrubs in shelter of the boulders.

The cliff itself, is partially covered by a thin mat of *Osteomeles*, *Ficus retusa*, etc.

Some seaward slopes back from the cliff, have a scrub of *Scaevola*, some *Pittosporum*, etc.

~~An arrangement on north side similar, belt of grass narrower. cliff has a mat of *Pennisetum*, *Lepturus*, etc. on it.~~

~~Wave cut platform at base of cliff has many mushroom rocks, larger of which are vegetated~~

Aug. 11 Henna Pt.

Flat limestone platform.
Interior a mixture of Pandanus
and grass.

South side has, at top of
cliff, a belt of *Zoysia*
and *Sporobolus virginicus*,
about 30 m. wide on thin
soil on rough limestone.

Cliff has no vegetation
except grass *Pemphid*, and
edryotis on ledges.

Locally some *Vitex* on top,
but this all killed at
least to ground by typhoon.

The grass turned rather
brownish, even the Pandanus
browned except actual
bases of leaves.

Arrangement on
north side similar,
but some ~~more~~ additional
species on cliff edge,
grass belt narrower,
cliff covered more or less
completely by a mat
of *Pemphid*, *Lepturus*,
Oblomelia, etc.

Wave cut platform
at base with numerous
mushroom rocks
the larger of which

are vegetated with
a mat of what
appears to be *Ostrea*
or *Pemphid*, or both.

Separated from this
by a channel is
a roughly circular
wave cut platform
with a band of
mushroom rocks.
Center may have been
a shallow lagoon.

In the center of the
plateau on the point
are a number of enormous
boulders of limestone,
the size of a house
eratic

The Pandanus scrub
is sparse, with low
Miscanthus in the
openings.

Back toward the island
are areas of grass on
soil, Pandanus on
soil and rock, and
Ostrea mat on rock.

Everything browned
more or less by typhoon.

Aug. 11 - Agai + Henna + ~~Saki~~
east end of island

38205⁵ *Hemigraphis*?
common at base of enormous
limestone boulder.

2 06 *Abutilon indicum*? (L.) Sweet
occasional among
great limestone boulders

1 07 *Asparagus* ~~reticulatus~~
rare on edges of cliff
limestone cliff

5 08 *Sporobolus virginicus* (L.) Kunth
dominant in open
areas back of cliffs.

Aug. 11 northeast of Henna,
east end of island
on rough pinnacled pitted
limestone.

09 (*Asclep.*) *Tylophora* ~~canadensis~~ *Marina*
common

5 10 *Hedyotis albido-punctata* (Merr.) F. & B.
common on vertical surfaces

11 *Desmodium* ~~rotundifolium~~ *canadense* (H. & A.) Nutt.
common on cliff edge

1 12 *Asparagus* ~~reticulatus~~ (L.) Merr.
rare on cliff edge

5 13 *Croton* ~~commersonii~~ M. & A.
common in low scrub

14 (*Legum.*) *Galactia* ~~turkiana~~
common on cliff edge

15 *Boerhaavia* ~~diffusa~~ *laevigata* (L.) DC.
common on bare ~~low~~ ledges

22 m.

prostrate; flowers white.

depressed much branched
suffrutescent herb.
procrumbent; leaves
fleshy.

forming a deep mat.

20-30 m.

twining vine,
flowers yellow-green,
(rarely flowering)
prostrate, sub-fleshy.

leaves glaucous;
flowers yellow.

depressed shrub.

prostrate

prostrate, flowers
pinkish.

38216 (~~lit.~~)

1 occasional in soil between boulders

2 17 *Psychotria serpens*rare *Psychotria ligulata* (Thunb.) T. Tanaka

5 18

Herb dense in limestone soil (rocky area)

common

4 19

Osteomeles anthyllidifolia

abundant on rocks near cliff edge

Aug. 11 - 0.7 km. so. of
 Aragusuba
 in secondary scrub
 on hill of limestone

5 20

Croton

occasional

4 21

(~~lit.~~) *Ficus affinis* (Thunb.) Nakai

rare

1 22

Commelina auriculata Bl.

rare at edge of

5 23

Morus australis

occasional

Aug. 13 - MCAT Compound, 1 km.
 so. of Hirara

5 24

Diospyros ferrea var. *ensifolia* (M. Nakai) S. H. Hwang

planted

prostrate.

shrub up to 1 m. tall;
flowers green.prostrate shrub,
forming dense mat;
fruit black when ripe.

55 m.



shrub 1 m. tall

herb 0.7 m. tall, branched;
stigmas purple.

prostrate; flower white.

shrub 1.5 m. tall.

40 m.

small tree 4 m. tall; leaves
 stiff, dark green, glossy;
 fruit orange when immature,
 dark brownish red when
 ripe, edible, with sweetish
 thin flesh.

Aug. 14 - Sugar mill 2.8 km
S. of Kaamichu
Large area of grassland
on low land with drainage
ditches. The grass is
largely *Imperata*, *Setaria viridis*,
Ischaemum sp. *Paspalum*
obiculare, *Panicum repens*.
Some weeds such as
Conyza. Scattered
clumps of *Pandanus*,
"Breynia", with some *Psidium*,
Morus, *Ficus erecta*, *Toddalia*,
Macaranga etc. and
scattered *Erythrina* trees.

The *Breynia* and associated
species, and ~~some~~ some
Miscanthus especially
lining drainage ditches.

In wet places *Fimbristylis*
of 2 spp., here *Ischaemum*
~~and~~ *Paspalum* & *Panicum*
predominate, also *Isachne*.
Additionally there are a
few minor grasses and reeds.

In the running water
of the ditches is a large
sterile *Eleocharis*.

The soil is a stiff
clay with $\frac{1}{2}$ cobble-sized

limestone fragments
in it.

The grass in this area
is harvested for fodder
and the *Imperata*
apparently comes into
flower after ~~at~~ the
above-ground part
has been cut - perhaps
the same reaction as
that after burning in
other places (here as well?)

Aug. 14 - Sugar Mill
~~0.8 km.~~ 0.8 km. S. of ~~Kasamichi~~
 Kawamitsu

in grassy area of low
 heavy soil, marshy in
 places, being drained.

- 38225 *Phragmites karka* (Retz.) Trin.
 scattered in wet spot
- 1 26 *Isachne alba* (Thunb.) Kuntze
 abundant in wet places
- 5 27 *Fimbristylis dehtoma* Vahl det J.H. Kern
 common in wet places
- 5 28 *Fimbristylis monostachya* (L.) Horsk. det J.H. Kern
 very common in wet places
- 7 29 *Imperata cylindrica* (L.) Beauv.
 dominant on most of
 the dryer places
- 4 30 *Paspalum orbiculare* G. Forst.
 common in wetter places
- 5 31 *Ischaemum* ~~dehtoma~~ ~~alba~~
 abundant in wetter places
- 2 32 *Themeda* ~~apoda~~ ~~montana~~
 occasional around thickets
- 2 33 *Fimbristylis dehtoma* Vahl det J.H. Kern
 occasional around thickets
- 2 34 *Eleocharis* ~~canadensis~~ (Roth.) Blake
 rare in wet place
- same - waste places
 around mill
- 5 35 *Themeda japonica*
 roadside
- 5 36 *Cyperus compressus* L.
 local in desiccating pool

2-3 m.
~~3-4 m.~~

erect, canes up to
 3-4 m. tall.
 mostly sterile

det. J.H. Kern *cacchitoy*

festile culms erect.

glaucous

4
~~3~~ m.

Aploda montana det J.H. Kern

- 38237 *Digitaria*
4 locally common
- 5 38 *Corchorus*
local
- 3 39 *Portulaca oleracea* L.
local
- 2 40 *Acalypha* ~~stuebeli~~
rare in cultivated ground
- 5 41 *Amaranthus spinosus* L.
locally common

Aug. 14 near Matsubara
Cultivated ground.
Hedgerows principally
Andisia Sieboldii (?)
with *Polypodium scolopendria*,
Asplenium nidus,
Thelypteris sp., *Ficus*
grecta, *Wikstroemia*,
Raphiolepis, "Breynia",
Acacia confusa, *Pittosporum*,

Ageratum - *kaho azami*
Amaranthus - *inobis*

Aug. 14 - 0.5 km. s.e. of Matsubara
in an around cultivated
fields on limestone or limestone soil.

42 *Cyperus revoluta* Thunb.
common

- 4 m. culms decumbent,
leaves glaucous!
↓ depressed diffusely
branched herb;
flowers yellow.
fleshy, prostrate
- thick-stemmed much-
branched erect herbs, to
0.7 m. tall.

These hedgerows are
on low walls of coral
cobble, picked up from the
fields. On the low
hills, which are outcrops
of limestone, in this
area the vegetation is
principally *Pandanus*
scrub 1-3 m. high.

15 m.

OK

shrub 1 m. tall, leaves
spreading to ascending,
stiff; carpels incurved,
forming a head-like structure
with the orange-red seeds
loosely held within it.

- 38243 *Sporobolus*
in grassy place
- 5 44 *Eclipta alba* Hassk.
in shallow ditch
- 2 45 *Oxalis corniculata* L.
in bare ground
- 1 46 *Lynedrella nodiflora* Gaertn.
in ~~barren~~ cultivated land
- 47 *Cardiospermum halicacabum* L.
in sweet potato patch
- 3 48
very local ~~is~~ on rough limestone
- 2 49 *Solanum aculeatissimum* Jacq.
occasional
- 5 50 *Euphorbia heterophylla* L.
common locally
- 3 51 *Polypodium scolopendria*
common in stone walls
- 1 52 *Mollugo pentaphylla*
rare in path
- 5 53 *Amaranthus*
- 1 54 *Ageratum conyzoides* L.
cultivated field
- 2 55 *Centella asiatica* (L.) Urb.
common
- 4 56 (~~grass~~) *Phyllanthus*
occasional in open bare ground
- 2 57 (~~grass~~) *Leptochloa paniculata* (L.) Hitchc.
occasional in open bare ground
- 1 58 (~~grass~~) *Tylophora* ~~tachai~~ Maxim.
on stone wall
- 5 59 ~~Andropogon~~
common in rocky place

flowers white.

flowers yellow.

flowers white.

shrub 1.5 m. tall; sterile.

herb to 1 m. tall (in shade);
fruit scarlet.

flowers green base of
bract scarlet.

flowers whitish

"inobis" (J) said to be edible.
flowers white; "kaksayami" (J)

stems prostrate,
superficial.

flowers yellow-green
culms erect.

1950

Phylla nodiflora (L.) Presl

38260

Lippia nodiflora L.

5

very common

5

61

Lespedeza striata (Thunb.) H. & A.
local on hard groundsame - in old quarry
in loose-textured coral limestone

5

42

Pteris (achindraya) P. *achindraya* Presl
common on walls

5

63

Adiantum *capillare* Presl
common on walls

5

64

Thelypteris *capillaris* Presl
common on floor

1

65

Cyrtomium falcatum (L.) Presl
rare on walls

5

66

Asplenium nidus L.
common on wallsprostrate; flowers
pinkish white.prostrate; flowers
bright rose purple.

10 m.

*Plaris ryukyuensis* Tagawa det C. V.
Platanrosette, accumulating
dead leaves in center.

1956

Aug. 14 - The damage ^{to vegetation} that resulted from typhoon Wanda, July seems to have been principally defoliation and the killing of small twigs, probably resulting from salt spray.

The fact that this is evident even in the interior of the island, however, suggests that simple evaporation may have been somewhat responsible.

Casuarina was browned a good bit especially near the sea.

Erythrina, Morus, Melia, Breynia, Excoecaria, Ficus wightiana, Leucaena

were almost uniformly and completely defoliated.

Morus and Excoecaria promptly burst into flower.

By a week after the typhoon Breynia was putting out an abundance of new leaves. A few days later Erythrina and Morus were doing the same and Melia to some extent.

In all, very few trees were blown down, only a few young Casuarina. Many limbs were blown off the Casuarina.

Pandanus showed little damage of any sort except that in the most exposed places a good many leaves were broken.

Agave showed no damage except broken flower stalks. Calophyllum showed little damage except some browning of leaves near the sea.

Miscanthus, where exposed to salt spray, shows conspicuous browning.

Aug. 15 - Typhoon

Babs came up rather suddenly, developing over night from a rather gusty "tropical storm".

During day the wind rotated from northeast to beyond southwest, and reached a strength of perhaps 50 knots with gusts to 80 knots with considerable but not heavy rain.

There is little damage evident in inland areas as yet.

At the beach near Nisradora, where there is an enormous dune ridge, largely covered by Pandanus, sand and salt spray are blowing in large quantities and with great force. The water that blows in horizontally from the sea is, by taste perhaps one third seawater. ~~Island~~ Behind the main dune ridge so much fine wet sand has blown in that the plants are covered by it as by

wet snow after a light wet snow-storm. This sand is so fine that there is as yet no obvious damage from it, though it definitely stings the bare legs. Some waterlogging of leaves is evident in exposed places in *Scaevola*, *Wilistroemia* and even *Calophyllum*. None in *Pandanus*, though.

Casuarina trees are whipping around, but none seen uprooted and only a few broken limbs.

Aug. 16 - just s.e. of
Tomori [Tomori]

(3)
(Photo
848-138)

broken land, partially
cultivated, some Miscanthus,
many rough pinnacles
with Porteria, Ardisia,
Pandanus, Cycas, spiny
rosaceae, Kalanchoe, Polypodium
scolopendria, Raphiolepis,
Nephrolepis, Pittosporum,
Pleioblastus, Macaranga,
Croton, Murraya, Erodia,
Ficus setosa, F. wightiana,
Derris trifoliata, Canavalia,
Brachymeria, Morus, Bischofia,
Claretia, Crinum, Carmona,
Ficus virgata, F. erecta,
Toddalia, etc. "Beynia"

The knobs are in place
built up with rough
cobble picked up from
the cultivated patches.
Terracing is intricate
and ingenious. Some
cultivated patches are
small.

Aug. 16 - 1.3 km. n.e. of Tomori
on rough limestone outcrops

38267
7

Smilax abnormis (Miq.) Merr. & Rolfe
occasional

5

18 Psilotum nudum (L.) Griseb.
occasional on exposed limestone

Aug. 16 1.3 km. n.e. of
Tomori

(4)
(Photo
848-138)

broad ridge with
knobs and pinnacles of limestone
and clumps of Pandanus,
grass patches of Paspalum,
cultivated patches, etc.

Knobs here have
Toddalia, Ficus erecta,
F. wightiana, Cycas, spiny
~~Raphiolepis~~, Raphiolepis,
Pittosporum, Nephrolepis,
Porteria, Ardisia, Ficus
setosa, Gardenia, Dianella,
Morus, Ampelopsis,
Polypodium scolopendria,
Cinnamomum, Pandanus,
"Beynia", Kalanchoe, Derris
trifoliata, Carmona, Calliandra,
Psilotum, Miscanthus,
Smilax.

The grass between them
is largely Imperata
with some Miscanthus.

85 m.

↓

wine, fruit green.

60

1956 Ryukyu Is.

77269 *Derris trifoliata* Lour.

3

common

5 70

~~*Phaseolus*~~ *Phaseolus* (L.) Blom.

abundant

Aug. 16 - just s.e. of Tomori
on and around rough
limestone outcrops.1 71 *Pisum indicum* L.

persisting in field after harvest

5 72 *Lysimachia mauritiana* Lam.

on bare cultivated ground

2 73 *Canavalia turgida* Graham

on bushy pinnacle

3 74 *Murraya paniculata* (L.) Jack

in scrub

5 75 ~~*Euphorbia*~~ *Euphorbia* (L.) Blom.

in scrub

2 76 *Pleuroblastus* (L.) Blom.common locally on
outcrops in soil pockets3 77 ~~*Phaseolus*~~
local in soilAug. 17 MCAT Compound,
1 km. s. of Hirara

weeds in lawn

5 78 *Euphorbia prostrata* Ait.

3 79

~~*Senecio*~~ *Senecio* (L.) Blom.

rare

3 80 *Plantago* ~~*major*~~5 81 *Echinochloa colonum* (L.) Link

common

MIYAKO

61

85 m.

↓

tangled in scrub. buds
pinkish at tips.
prostrate, fruit immature

40 m.

↓

flowers white.

compactly branched;
flowers pinkish white.
twining vine; pods
inflated.

shrub 2 m. tall;

flowers white.

shrub 2 m. tall;

buds white; fruit immature.

canes green, turning
yellow, 1-2 m. tall

in small clumps; sterile.

prostrate; flowers purple.

40 m.

↓

prostrate, purplish.
stems decumbent; flowers
white

culms ascending

Aug. 19 - 13-15 km. n.e. of Naga

on edge of limestone cliff
38282 *Cinnamomum asiaticum*
occasional

5 83 *Leucas*
common

3 84 *Ficus pumila* L.
common

on grassy plateau,
clay soil over limestone
2 85 *Fimbristylis dichotoma* Vahl det. J. H. Kern
occasional

5 86 *Setaria viridis* (L.) Beauv.
common locally

1 87 ~~(leaves)~~
rare

5 88 *Fimbristylis dichotoma* (L.) Vahl
common locally

on steep slope over sea,
clay soil with coarse grass and
2 89 *Alpinia speciosa* (Wendl.) K. Schum.
common

2 90 *Mallotus japonicus* M.-A.
common

5 91 ~~*Excoecaria*~~ *Melicope australis* (H. Bates) Short
common

1 92 *Leucas*
at foot of cliff

60 m.
↓

flowers white, with
a heavy fragrance;
filaments and style
maroon purple.

spreading; flowers white.

stems ascending; sterile.

flowers violet, wings
curving in at tips.

det J. H. Kern

shrub

30 m.
↓

herb 1 m. tall, ripe
fruit orange-red,
ribbed.

shrub 1.5 m. tall, badly
battered by typhoon.

shrub 1.5 m. tall,
flowers white; fruit immature.
flowers white.

40 m.

38293 *Ficus erecta* var. *becheriana*
common

~~94 *Euonymus*~~

5 94 *Euonymus japonicus* Thunb.
common

2 95 *Hibiscus abelmoschus* L.
local *Abelmoschus moschatus* Pers.

3 96

common at base of cliff

2 97 *Vitis*

occasional

3 98 *Callicarpa* *japonica* var. *longipes* Pich.
occasional

Aug. 20 - MCAT Compound,

1 km. S. of Hirara

weeds in and around lawn

3 99 *Chrysopsis aciculatus*

38300 *Emilia sonchifolia* (L.) DC.

2

Digitaria chinensis

2 01 *Digitaria chinensis*

5 02 *Justicia procumbens*
common

30 m.

shrub 1.5 m. tall,

ripe fruit purple, edible
but rather tasteless.

shrub 2 m. tall; fruit
green.

herb 1 m. tall, branched,
fruits dry.

40 m.

flowers lavender.

30 m.

climbing vine, sterile.

~~the~~ weak shrub,
flowers lilac.

40 m.

↓

Pluchea odorata (L.) DC.

scapes stiffly ascending.

leaves firm, very
slightly glaucous. flowers
bright purple, ~~some~~ ~~of~~

OK A

40 m.

exceeding involucre.

culms spreading to
somewhat ascending.

much branched bushy
herb, flowers white,
lip marked with purple.

Aug. 20 - east of Hirara

low ridge with
Banana plantation
on slopes, Pandanus
scrub on top.

Pandanus scrub is
a mixture, principally
Pandanus, but with
many other plants:

Pandanus tectorius

Hibiscus tiliaceus

Miscanthus

Callicarpa sp.

Rhamnus sp.

Toddalia asiatica

Morus australis

Acacia confusa

Chalaquus sp.

"Breyeria"

Bauhinia sp.

Wikstroemia

Carmona uluza

Psidium guajava

Vitis sp. (not lanata)

Ficus erecta

Raphiolepis

Cycas revoluta

Cinnamomum

Gardenia

Mallotus japonicus

Ardisia

Clematis tobira

Pittosporum

Psychotria lincuiensis

Vitis lanata

Phyllanthus securinega

Boehmeria

Ampelopsis

similar

Nephrolepis

Ehretia

Where undisturbed
this is an impenetrable
tangle about 2 m.
high, with acacia
and other trees as
emergents.

Farther east is a large
pine plantation - trees
about 4-5 m. tall, up to
6-8 cm. diam. There are
rather irregularly
spaced and there is a
thick understory of
Pandanus with many
secondary shrubs.

Cinnamomum camphora

Raphiolepis

Osbeckia chinensis

Psidium

Toddalia

Gardenia

Mallotus japonicus

Deep brown
soil with
no limestone

Aug 10 west of Pinalakayano

rounded grassy hills
between ice patches.

Imperata grassland
with ~~many~~ abundant sedges,

Rhynchostoma rubra

Eragrostis amabilis, *Imbristylis* 3 spp., *Ischaemum*,
Wedelia chinensis, *Centella*,
Lespedeza cuneata, some
shrubs on steep slopes.

Here and there are protrusions of limestone but not abundant.

Aug. 20 - west of ^{0.5-1 km.} ~~Piripa~~ ^{Nabazone}

on ^{low} grassy hills of clay
between rice fields.

38303 Rhynchospora *subra* (Lour.) Makino
7 abundant

3 09 Andropogon
occasional

5 14 Ischaemum
common

5 06 *Fimbristylis diandra* (L.) Vahl
common

5 of *Fimbristylis* common

3 08	Fimbristylis	"	"
	common		

3 09 *Imperata cylindrica* (L.) Beauv.
dominant

10 *Paspaleya cuneata* G. Don
common

an erosion scar shows
this to be weathered
limonite clay, with
concretions, etc. and
spots where it is not
weathered much.

20-30 m.

1/2

caespitose, erect.

decumbent, tips ascending

Det. J. H. Kern

14

4

0.1s

etc.

flowering in areas
where it has been cut for fodder.
sterile, apparently
diseased.

Aug. 20 - ridge 1.5 km. east
of Hirara

38311 ~~Raphis~~ *Nephrolepis* ^{10 m.}
very common on limestone

2 12 *Callicarpa* ^{10 m.}
occasional

5 13 *Cinnamomum japonicum* ^{10 m.}
common

2 14 *Macaranga tanarius* (L.) M.-A.
occasional.

4 15 *Callicarpa japonica* Thunb.
occasional

5 16 *Psychotria linbriueana*
common locally

1 17 *Raphiolepis* ^{Nakai}
rare

1 18 *Callicarpa japonica* Thunb.
rare

1 19 *Vitis* ^{Ampelopsis}
rare

1 20 *Corypha canadensis* (L.) Crong.
occasional along road

2 21 *Leucaena glauca* (L.) Benth.
occasional

2 22 *Toddalia asiatica* Lam.
very common

2 23 *Phyllanthus* ^{Skarinsaga}
common

5 24 *Phyllanthus* ^{Bruguiera}

fronds erect or almost so

low bush 0.6 m. tall;
flowers lilac.
shrub 1 m. tall, ~~tree~~
aromatic when broken;
leaves not glaucous beneath.
shrub 2 m. tall, sterile.

shrub 3 m. tall; flowers
lilac.

shrubs 1 m. tall;
flowers greenish white;
fruit immature
shrub 1 m. tall, fruit black.

almost prostrate shrub;
flowers lilac.
vine, climbing in
bushes, sterile.

shrub 2 m. tall.

scandent shrub;
buds only.

shrubs 2 m. tall
flowers white.

Aug. 20 - 3.2 km. E. by m. of
Hirara, s.w. of Nakayone
young pine forest on
rolling clay hills.

38325

Raphiolepis (L. var. *indica*)
common

2 14

Mallotus japonicus M.-A.
very common

f 5

27

~~*Osbeckia chinensis*~~
common

3

28

Cinnamomum camphora
common (Nees & Fernald)

Aug. 21 - 3.7 km. e. of Hirara

low clay hills covered
by a secondary (old field)
scrub about 1-2 m. tall,
sparse, mixed with
Miscanthus, sparsely
planted with young
pines 2-4 m. tall, or locally
Casuarina.

shrubs seen:

Gardenia

Schinus

Podocarpus

Elaeagnus

Mallotus japonicus

Cinnamomum camphora

Raphiolepis

Pandanus

30 m.



shrub 1 m. tall, fruit
black.

shrub 1 m. tall (all
seen about this height);
flowers cream white.

shrub 0.8 m. tall;

fruit immature.

shrub 2 m. tall, compactly
branched, strongly
aromatic; leaves glaucous
beneath; sterile.

Ficus erecta

Lauras (Perau-like)

Osbeckia chinensis

Cinnamomum japonicum?

"*Preynia*"

Toddalia asiatica

Carmona retusa

Ardisia

Nephrolepis and
sedges are common

Callicarpa

Morus

Antiderma

Ficus virgata

Nahazont

Aug. 21 beyond Pimpa

Slope down to sea is about 20° - littered with great limestone boulders.

Vegetation a mixture of *Miscanthus* - 2-3 m. tall, patches of *Imperata* and shrubs 2-3 m. tall - *Ficus wightiana* gardening

Phoruse

Breynia"

Ficus erecta

Hibiscus?

Macaranga

Toddalia

Phragmites

Pandanus

At the top is mainly *Imperata* but with some *Erythrina* and shrubs on limestone outcrops

A deposit of fine sand a few yards square on the rim. Possibly brought there

On the way up on the land side the road is cut 2 m. into a finely bedded sand with layers of stiff gray clay and of soft black pebble-like concretions.

Aug. 21 - 1 km. e. s. e. of ^{Malapara} ~~Malapara~~
in thicket at edge of cultivated
ground, fine sandy soil.

- 38329 *Lambinus* ^{in some hills}
4 common at edge of thicket
2 30 *Pouzolzia* ^{in some hills}
rare at edge of road
2 31 *Boehmeria nivea* (L.) Gaertn.
common

same -
on clay slope with limestone
boulders, leading down to
sea, mixed tall grass,
short grass and bushes.

- 2 32 *Ibisicus mutabilis* L.
occasional

- 5 33 *Ficus vightiana*
very common
^{in some hills}

- 5 34 *Morus australis* ^{in some hills}
common

same -
edge of ditch in cultivated ground

- 5 35 *Cyperus* ^{in some hills} ^{all kinds} ^{OK}
36 *Albizia* ^{(L.) Gaertn.} ^{J H Kern}

Aug. 21 3.5 km. east of Kirara
in secondary scrub
~~with~~ on low clay hills.

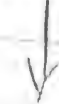
- 3 37 *Nephrolepis* ^{in some hills} ^{(L.) Gaertn.}
very common on ground
5 38 *Ficus erecta* Thunb.
very common

50
m.



herb 1 m. tall; flowers
white, glands yellow.
prostrate
weak shrub, branches
ascending to drooping.

30 m.



shrub 2 m. tall, sterile.

shrubs 2-3 m. tall, lactiferous;
2 plants represented,
one with white stipules, one
with immature fruit.

shrub 1.5 m. tall,
fruit green, turning pinkish.

40 m.



erect, solitary
erect herb 0.8 m. tall.

35 m



fronds erect.

shrub 1 m. tall,
ripe fruit dark purple.

- 38339 *Lichina* *lemaneiformis*
 5 very common
 3 40 (*Laurac.*) *Madia thurberiana*
 common
 1 41 ~~*Pyrostachys*~~ *Randis?*
 rare
 5 42 *Antidesma* *indica*
 occasional

Aug. 22 - Air Force Establishment
 small limestone
 hill covered by a coppice
 like scrub of *Canarium*
ardizianum, *Portulaca*, *Arenaria*
 with 4 tall *livistona*
 growing up out of it.
 These have the stiffly
 ascending straight
 panicles of the *Isigaki*
 plants. Leaf tips scarcely
 drooping. No fruit or
 flowers. Many young
 plants.

Aug. 22 - Air Force Establishment,
 Nukunai Lake

- open waste ground around building
 5 43 *Paspalum* *univittatum*
 common
 3 44 *Eleusine indica* (L.) Gaertn.
 common
 3 45 *Dactyloctenium aegyptium* (L.) Beauv.

- shrub 2 m. tall,
 fruit immature.
 — shrub 2 m. tall. leaves
 glaucous beneath,
 disagreeably aromatic
 when broken, sterile.
 — shrub 1 m. tall,
 shrub 1.5 m. tall; flowers
 yellow-green; fruit
 reddish black when ripe, some.

erect

culms spreading, ascending.

culms prostrate

38746 *Apium leptophyllum* (Pers.) F. Muell.
occasional

~~Aug. 22~~ - 1 km. s. e.
Hirara

on walls and floor of
excavation in coral limestone

5 47 *Pteris vittata* L.
common

2 48 *Nephrolepis linnata* (Sw.) Mett.
common

1 49 Lab.) *Taxodium occidentale* var. *insigne* (Blume) Hance
rare on floor

1 50 *Plantago rugelii*
rare on floor of excavation

Aug. 23 - 0.4 km. n. Woteka
scrub forest on walls
of ravine -

Euphorbia
Melanolepis
Mascaranga
Pandanus
Cycas
Morus

a *Bischofia*
Commersonia
Alocasia
Mallotus japonicus
Breynia
Ficus virgatus
Mallotus cylindricus
Andisia
Asplenium nidus

20 m.



pendent from walls (also
erect on floor)

Gardenia
Murraya
Commersonia japonica

Ficus wrightii
Antidesma
Pittosporum
Gardenia
Pinus umbellifera
app. lg. trifoliate tree
Ficus retusa
Crataeva
Diospyros maritima
Randia
Wikstroemia
Psychotria
Mars
Mallotus philippinensis
Melia
Solanum sp.

Aug. 23 - 0.5 km. ^{s. of Kumadake} ~~s. of Matsuba~~
along stream.

in degraded scrub forest
on limestone walls of ravine

38351 *Mallotus philippinensis* (Lam.) M. A.
rare

2 52 *Flagellaria indica* L.
occasional

3 53 *Nephrolepis* ^{prostrata}
on rough limestone
boulders

3 54 *Nephrolepis* ^{prostrata}
on overhanging rough
limestone boulders

2 55 *Amorpha*
rare

3 56 *Microlepia* ^{steigera} (Thunb.) Presl
common

2 57 *Psychotria*
common in undergrowth

1 58 *Melanolepis multiflorula*
common

7 59 *Marsilea* ^{tenax}
abundant in undergrowth

2 60 *Psychotria*
common in undergrowth

2 61 *Mallotus*?
common in undergrowth

Melastoma ^{fruticosum} M. A. var. ^(?)
brevisides

2 62
in openings on bare limestone

45 m.



shrub 3 m. tall; sterile.

vine climbing in trees;
sterile.

arching, tending to droop.

fronds pendent
(presumably the same
as #38353)

shrub ~~2~~ 2 m. tall, leaves
slightly glaucous
beneath, ~~sterile~~ appearing
distichous; sterile.

shrub 1 m. tall; fruit
immature.

shrub 3 m. tall

weak sprawling
shrub, fruit immature.

shrub 1 m. tall.

fruit turning yellow.

shrub 2 m. tall; leaves
glaucous beneath.

petioles red; sterile.

prostrate herb; sterile.

- 38363 *Solanum verticillatum* L.
common
- 7 64 *Randia (Ravettia?)*
rare
- 5 65 *Ficus virgata* Reinw.
common
- 2 66 *Diospyros maritima* Bl.
common
- 6 67 *Wikstroemia indica* A. Gray
occasional in open places
- 6 68 *Mallotus japonicus* M.-A.
common, especially
around openings
- 5 69 *Murpinia trifolia*
common
- 4 70 *Bischofia javanica* B.
abundant, ~~common~~
comprising a large
proportion of the forest
- 4 71 *Pisonia umbellifera* (Forst.) Less.
occasional
- 3 72 ~~*Crataeva religiosa*~~
occasional
- 3 72 *Crataeva religiosa* Forst.
occasional
- 5 73 ~~*Flex?*~~
common
Aug. 27 - 4 km. s.e. of Hiras,
in cultivated ground
- 1 74 *Verbena officinalis* L.
- 5 75 *Melochia*
common

- shrubs 2-3 m. tall;
flowers white.
- shrub 1 m. tall; fruit
immature.
- small tree 5 m. tall.
figs turning red.
- small tree; sterile.
- shrub 2 m. tall,
leaves young; buds green.
- shrub 1 m. tall,
stigmas yellow to red.
- tree 6 m. tall; fruit
immature
- tree 6 m. tall; fruit
brown
- small tree 4 m. tall
(badly beaten by typhoon);
flowers greenish white,
just opening.
- shrub 2 m. tall,
petioles and veins
purple (young leaves);
sterile
- tree 6 m. tall; sterile
- n. of Zumori
50 m.
- flowers rose purple.
flowers rose purple

Aug. 23 - "Colonel's Beach",
O Sakai

on sand dunes

38376 *Lepturus repens* var. *subulata* Forst. 6 m.

5 common

3 77 *Thunarea involuta* (Forst.) R. & S.
common

same -

1 78 *Adiantum* *capillare* L. on rough limestone cliffs facing sea.
in crevices 3 m.

4 79 *Limnium arbusculum* (Maxim.) Makino
common just above high tide level 2 m.

1 80 *Adiantum* *capillare* L.
on ceiling of cave

2 81 *Hedyotis albida-punctata*
common just above
high tide level

2 82 *Lepturus repens* var.
just above high tide level

same -

1 83 *Euphorbia charnisonis*
occasional E. white Forst. on sand dunes

1 84 *Leucas*
occasional

84a *Maytenus?* *Gynocarpia decapetala*
common 19 m.

tufted, with runners.

prostrate, forming mats.

2 m

prostrate, fleshy.

2 m

5 m

prostrate

5 m.

prostrate, flowers white.

depressed shrub; flowers
white.

Aug. 24. base of Si-Henna.
Misaki.

small finger. like
limestone peninsular-
remnants of a dissected
3 m (1000?) plateau
extremely rough.

fine coarse sand soil
in pits and basins.

Here are a *Caecula*

a *Boysia cuneifolia*,

la *Lepturus repens*

a *Limnium arbusculum*

f *Hedyotis albidus punctata*

c *Messerschmidia*

f *Asparagus*

c *Vitis*

c *Angelica* ? (dry-shattered)

la *Descurainia*

la silvery leaved prostrate legum

This lines the
entire coast here.

back of it is solid *Pandanus*

Aug 24 north of
Kanimata

scrub forest on
limestone ridge
statue about 6 m.
main layer (*Pandanus* absent)

Diospyros maritima
Ardisia

Ficus virgata

Pouteria

Ficus retusa

~~*Thespesia*~~ *Celtis*

Diospyros persea

Gardenia

Surpinia

Undergrowth

Diospyros maritima

Croton

Psychotria

Antidesma

Ardisia

Lianes

Flagellaria

Lonicera

Epipremnum

Piper

Vitis

Epiphytes (also on rocks)

Asplenium nidus

no ground cover except sparse *Piper*
here and there

Erythrina
Pterocarpus

Aug. 24 - 0.5 km. n. w. of
Karimata

in dense scrub forest on
limestone ridge

38385 *Piper* ^{*hadsura* (L.) Bl.}
common, mostly on ground

~~86 *Abutilon*~~

2 86 *Elaeagnus* ^{*monophylla* Thunb.?}
common in edges and along path

5 87 *Antidesma* ^{*frutescens* var. *frutescens*}
occasional in undergrowth

5 88 *Cinnamomum japonicum* Sieb.
occasional

Hydrocotyle ^{*brevipetiolata* Tr. & G.?}

2 89 *Vitis*
common

6 90 *Pongamia* ^{*pinnatifida* (L.) Merr.}
occasional

3 91 *Alpinia chinensis*
common

3 92 *Ilex*?
common

3 93 *Celtis*? ^{*hirsuta* var. *glabra* Ktze.}
common

94 *Abutilon* ^{*indicum* (L.) Sweet}
weed by roadside

Aug. 24 - 1 km. n. w. of Karimata
in Pandanus scrub on coral
cobble ridge

5 95 *Pandanus*
dominant

3 96 (lit.)
common locally

20-30 m.

↓

sterile creeper.

erect shrub, sterile.

shrub 2 m. tall, flowers
pale green.

shrub 2 m. tall (others
seen to 5 m.); fruit
immature.

vine, climbing in
undergrowth, sterile.

tree 8 m. tall, leaves
new; flowers rose pink,
rather unpleasantly
fragrant.

rhizome aromatic;
fruit immature.

tree 4 m. tall, sterile.

tree 6 m. tall, widely
spreading, leaves new; sterile.
flower orange

3 m.

shrub 2 m. tall, fruit
head subglobose, orange.
flowers bright lavender.

Aug. 24 - base of Iri-Hama
Misaki Peninsula, 1.7 km. n.w.
of Karimata

on extremely rough
pitted limestone platform

38397 *Galathea* *crab* *crab*
common

5 98 *Asparagus* *calcaratus* (L.) DC.
common, rooted deep
in pits.

4 99 *Limnium arbusculum* (Maxim.) Makino
very common

38400 *Hedyotis albido-punctata*
very common

2 01 *Messerschmidia argentea* (L.f.) Johnston
occasional

5 02 *Sesuvium portulacastrum* L.
common

Aug. 24 - 1 km. ^{4.4²} of Karimata
grassy thin soil

5 03 *Cymbopogon* *calcaratus* (L.) Presl A. Camus
common on grassy thin soil on

5 04 *Pandanus*
dominant on limestone ridge

2 m.



prostrate, ^{extensive,} forming mats

procumbent; flowers
yellow-green.

dwarf, depressed shrub;
flowers with lavender
collars

prostrate, fleshy; flowers
white; fruit fleshy.

small shrub; leaves
silky green, fleshy.

prostrate, stems
green, scarcely red tinged;
brittle, leaves somewhat
compressed, scarcely glossy;
flowers pink.

20 m.

tufted, culms erect;
aromatic when bruised.
shrub 2 m. tall.

Aug. 25 Ogami. Shimo
west and northwest slope
of Shimoyama clay
and soil covered grass
it. Mostly cultivated
patches and that do
not look very fertile.

Ardisia,

Terrestrial, edges
covered by Miscanthus
and a small bamboo.

Patches of forest include
Ficus retusa

Arenca

Ardisia

Raphiolepis

Ficus wightiana

Pandanus

Diospyros ~~sp.~~

Diospyros ~~sp.~~

Ficus virgata

Machilus

Limestone cliffs

with loose irregular
scrub of *F. retusa*, *Lythra*

Scaevola, *Pandanus*, *Miscanthus*
with ferns on vertical
banks and talus.

Boulders of rough
limestone perched on
the banks of cliffs
also scattered on the talus

down to sea below
broad wind-swept
scrub of *Ficus retusa*,
Scaevola, *Pemphis* (near sea),
Osteonema (near sea)

On sloping terrace
is a low degraded wood
of *Pandanus*

Diospyros maritima

Ardisia

Pittosporum

Antidesma

Arenca

Morus

The steep slope below
the summit is *Miscanthus*.

Plants seen but not collected

Hoya carnosae

Leucaena glauca

Eclipta alba

Calophyllum inophyllum

Ipomoea batatas

Miscanthus sp.

Pandanus tectorius

Lippia nodiflora

Aug. 25 - Ogasima Jima
in scrub forest on
northwest slope.

- 38425 *Arenca tremula* (Blanco) Planch.
abundant in undergrowth
- 4 06 *Croton* *cunninghamii* (H.B.K.) Merr.
abundant in undergrowth
- 2 07 *Callicarpa* *japonica* (Thunb.) Kuntze
occasional in undergrowth
- 3 08 *Morus australis* (L.) Alston
common
- 2 09 *Ficus retusa* (L.) Vahl
commonest woody plant
on island
- ~~10 *Diospyros* *virginiana* (L.) Walp.
occasional~~
- 5 10 *Diospyros maritima* Bl.
very common
- 3 11 *Ardisia* *richardsonii* (Hig.) Merr.
dominant
- 2 12 *Antidesma* *portlandicum* (L.) Benth.
common
- 3 13 *Rapthiolepis* *linchuanensis* (Hig.) Nakai
common
- 2 14 (lit.) *Liriope spicata* Lam.
common in this place
- same -
in dense *Ardisia-Diospyros* forest
- 2 15 *Derris trifoliata* Lam.
common

25 m.

- A. argentea* (L.) Merr.
stem 1 m. high;
fruit red when ripe,
panicle cernuous.
shrub 1 m. tall. flowers
white.
- shrub 1 m. tall, buds
lavender.
- small tree, sterile.
- erect shrub 2 m. tall
fruit immature.
- ~~upright tree~~
small tree; fruit immature.
- small tree, fruit green.
(leaves vary greatly in
size from tree to tree;
most trees sterile).
- shrub 2 m. tall
- shrub 1.5 m. tall, ripe
fruit black.
flowers deep lavender
- 40 m.
liana; cauliflorous,
flowers pinkish white.

- 38430 *Echinochloa colonum* (L.) Link
common in cultivated ground
- 4 31 (~~grass~~) *Leptochloa panicea* (Retz.) Steud
local in cultivated ground
- 3 32 *Polypodium scolopendria* Burm. f.
common on terrace walls
- 2 33 *Lysimachia mauritiana* Lam.
occasional on edges of cultivated ground
- 2 34 *Paspalum orbiculare* Forst.
occasional in grassy places
- 1 ok fleshy 35 *Fimbristylis*
occasional in grassy places
- 3 36 (~~clast.~~) *Gymnospora divaricata* Makino
common on rocks and edges of terraces
- 3 37 *Ficus virgata* ? Reinw.
occasional on edges of terraces
- 1 38 ~~Antidesma~~
- 1 38 *Ficus retusa* var. *villosa* Thunb.
very common on terrace walls
- 5 39 *Fimbristylis dichotoma* (L.) Vahl det. H. K. M.
common in grassy place
- 1 40 *Cyperus*
rare in grassy place
- (38436) *Portulaca oleracea* L.
rare cultivated ground
- same -
in thicket around ~~cultivated~~
terraced land
- 2 41 *Ardisia* ~~villosa~~ Thunb.
common
- 1 42 *Pittosporum tobira* (Willd.) Ait.
rare
- 2 43 *Antidesma pentandrum* var. *laetifolium* (Poeb.) Merr.
common

- 15 m. culms ascending
- " " "
- " " *Microstegium subquadratum* (L.) Presl
- " " leaves fleshy, young plants seem to be seedlings, old ones dead.
- " " " "
- " " prostrate shrub
flowers white.
- ok - semi-scandent shrub;
fruit immature.
- semi-scandent shrub,
fruit pinkish.
- 15 m. " "
- 15 m. shrub 2.5 m. tall.
- " erect shrub 1 m. tall.
- shrub 1 m. tall; ♀; flowers green

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1956 Ryukyu Is

- 38444 *Antidesma* ~~patan~~ ^{common}
 5 - common ~~in~~ ⁱⁿ (H. al.) ^{Mez.}
 2 45 *Pisonia umbellifera* (Forst.) Seem.

rare

- 1 46 (~~bambusa~~) *Diablastus* ~~trindadi~~ (Munro) Nakai
 common

same -

on rough limestone

- 2 47 *Wikstroemia* ~~redua~~ A gray
 occasional
 2 48 *Hedyotis albido-punctata*
 common in pits
 1 49 (~~legum.~~) *Galutia* ~~tashiroi~~ Mez.
 occasional

same

on and silty sand outcrop

- 3 50 *Digitaria* ~~hensis~~ ^{benygi}
 common on bank along trail
 2 51 *Fimbristylis dichotoma* (L.) Vahl
 common on bank

- 2 52 *Hedyotis albido-punctata*
 common on vertical exposure

- 2 53 *Pteris* ~~fauvici~~ ^{fauvici}
 on ~~vertical exposure~~ ^{talus bank}

- 5 54 *Thelypteris* ~~acuminata~~ ^{acuminata} (H. all.) ^{Mez.}
 common on talus bank

- 2 55 *Commelina* ~~diffusa~~ ^{diffusa} Burm.
 occasional at bottom of
 talus bank

same -

on vertical cliff of highly
 weathered sandstone.

- 2 56 *Hemigraphis*
 local

Ogami Jima

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- 15 m. shrub 1 m. tall; ♂; flowers
 whitish.
 " small tree, flowers white.

- 100 ft. A. H. ^{Mez.}
 " small clumps.

- 20 m. shrub 1.5 m. tall;
 flowers greenish yellow.
 70 m. fleshy; flowers white.

25 m

- 5 ft. ↓ ^{Mez.}
 115 J. H. Kern

fleshy; buds white.

prostrate, rather
 extensive; flowers with
 3 equal bluish petals.

40 m.

prostrate; flowers white.

38457

~~*Angelica*~~ *Pteris* *fraxinifolia* Thunb.

L

common (also on limestone sea-cliffs)

2 58

Pteris *fraxinifolia* Thunb.

common

5 59

Cyrtomium *patens* (L.f.) L.

common

3 60

Scaevola sericea Vahl

common locally (dominant below on sea cliffs of limestone)

1 61

Hibiscus tiliaceus L.

common

1 62

Emilia sonchifolia (L.) DC.

rare at base of cliff

- 63

Phenomenis chinensis (L.) Maxon

abundant locally

on rough limestone just above sea

3 64

Philoxerus wrightii Hook. f.

very local

1 65

Lepturus repens var. *subulatus* Forst.

common

3 66

Limnium arbusculum (Maxim.)

common

Mabino

2 67

Pemphis acidula Forst.

abundant

1 68

Boerhaavia ~~*mutabilis*~~

rare

3 69

Osteomeles ~~*anthyllifolia*~~

common forming very thin mat over flat or sloping pitted surfaces of undercut boulders.

410 m

↓

sterile at this season;
glaucous.shrub; fruit white,
fleshy (mostly without
fruit - due to typhoon?)shrub 2 m. tall, badly
battered by typhoon.flowers purple, scarcely
exceeding involucre.
fronds coriaceous.

1-2 m.

↓

fleshy, forming a
tight mat; buds
scarcely pinkish.mostly sterile and
out of reach.depressed dwarf shrub;
flowers lavender.prostrate shrub. leaves
fleshy; all seen sterile.prostrate; leaves white
beneath. buds pinkish.prostrate; fruit black
when ripe.

1956 Ryukyu Is.

Aug. 25 - Ogamijima -
account of vegetation:

Ogamijima is a tiny island 0.75 km. long, and 0.5 km. wide, roughly diamond shaped, ~~and~~ 77 m. high, shaped like an irregular low pyramid. It is situated at $125^{\circ}18'30''$ E $24^{\circ}55'8''$ N, just 4 km. east of the northern tip of Miyako Jima.

It is essentially a tilted mass of weathered sandstone and clay beds of the Shimajiri formation veneered in ~~large~~ part by a layer of raised reef limestone of the Ryukyu formation. The sandstone ~~is~~ is mostly weathered and soft, producing a fine sandy soil, varied here and there by clay. This is mostly terraced and used as garden patches by the inhabitants, who number ~~judging~~ by the unluxuriant appearance of the crops, mainly sweet potatoes,

On the terraces are found the usual community of a little widespread weeds, such as *Echinochloa* *colonum* and other grasses, *Portulaca*, *Trinervia* of several species, *Phyllanthus*, *Amaranthus* and various others.

Ogamijima

peanuts, cow peas, and sugar cane, this soil must not be very fertile. This is in spite of the fact that in places it has a high calcium content in the form of fossil and recent marine shells. It is badly eroded locally, but the terraces are mostly well built and the walls held by grass (*Miscanthus* *imperator*, *Andropogon*, *Ischaemum*) ~~and~~ ^{and} various shrubs, such as ^{and} *Ficus* *retusa*. The growth on these walls presents the appearance of hedges. *Cycas* *revoluta* is common. The soil on the limestone is mostly rather thin and usually exists only in pits and pockets. Great limestone boulders have rolled or slumped down the sandy slopes and exist scattered here and there on the slopes and in an accumulation at the base on the landward edge of the broad reef flat.

Roughly two thirds of the ^{total} area is terraced and cultivated. The remainder is rather

varied in its vegetation.

The south and west faces of the upper ^{side} pyramid, above about 50 m. are

densely wooded with a scrub forest dominated by *Ardisia richboldii* and *Diospyros maritima*,

with some *Ficus retusa*, *Ficus virgata*, *Pouteria ferruginea* and *Machilus thumbergii*. ~~The undergrowth~~

This forest is perhaps 6-8 m. high. It has a well developed undergrowth of shrubs up to 2 m. high, especially *Arenca tremula*, *Antidesma japonicum*, *Raphiolepis* sp., and young saplings of *Diospyros* and *Ardisia*, and locally a small bamboo.

Vitis lamata, and *Flagellaria indica* ~~are~~ ~~common~~ and *Derris trifoliata* are common lianes.

On a part of the west slope this forest goes down to the undercut sea-cliffs. Northwestward it becomes more scrubby and degraded with some *Pandanus* and *Morus*. Here it is mostly

only about 3 m. high and the canopy is rather open.

The northeast side of the upper pyramid is covered by *Miscanthus* and scattered shrubs of *Raphiolepis* except where boulders and crests of limestone project up and are covered by a closely wind-sheared scrub mainly of *Ficus retusa*.

The lower part of the east slope of the northwest ridge is covered by a mixture of scrubby thicket and *Miscanthus*, except where there are few terraces. The east slope is largely terraced but has some ~~soft~~ cliffs of soft weathered sandstone. There are bare in places or with a few ferns and shrubs such as *Ficus retusa* and *Leucoclea sericea*.

The east ridge is largely *Pandanus* scrub, but with some *Miscanthus*, ^{lycas.} and ~~various~~ miscellaneous shrubs.

Beach just north of
Aug. 25 - Karimata Beach

37470 *Portulaca oleracea*? L.
common on sand

2 71 ~~*Cymodocea*~~ *pinnifolia* (Miki) den Hartog det. C. den Hartog 1969
Halodule common on sandy reef flat, not uncovered at ordinary low tides

2 72 *Thalassia hemprichii* (Chenb.) Aschers.
common on sandy reef flat, not uncovered at ordinary low tides

Ogami (Id.)

The lower slopes of the island end in great piles of tremendous limestone boulders, mostly undercut with deep nicks between tides. In places there is a bare vertical cliff of soft ~~sandstone~~ bedded sandstone.

The limestone boulders are deeply pitted and dissected. They are mostly covered, above the zone of intensive spray, by a wind-sheared (or spray-sheared) mat-like scrub of *Pemphis acidula*, *Scaevola sericea*, and *Lepturus*. In the more protected

fleshy; flowers 1 cm. across, petals bifid; stamens few. rhizomes buried in sand, forming thin mat.

in Petermann and *Cymodocea rotundata* Chenb. & Hempr. ex Aschers. det. C. den Hartog 1969

rhizomes deeply buried, forming a thin sod.

spots are trichets, mostly of *Pandanus*.

In the zone of intensive spray, up to about 5 m. much of the rock is bare and exceedingly rough and sharp. There is a characteristic sparse plant community here made up of *Lepturus* dwarf shrub, *Pemphis acidula*, *Lepturus repens*, *Pedryotis albida-punctata*. On gentler slopes, such as the tops of boulders, is a thin mat of *Osteomeles* and a prostrate silvery-leaved legume. Very locally, just at or above high tide, are small tight mats or cushions of *Phyllocladus wrightii* in pits in the rock.

Aug. 24 - small bay
2 km. n. of Otake, S.W. of
in low beach scrub ^{Manatsu}

38473 *Wedelia biflora* Willd. ^{common}

3 74 *Premna obtusifolia* R. Br. ^{common}

2 75 *Pemphis acidula* Forst. f. ^{common on rocky places on limestone}

2 76 *Randia* ^{Tarome} ^{rare}

2 77 *Hernandia sonora* L. ^{occasional}

3 78 *Caecvola sericea* Vahl ^{abundant}

2 79 *Clerodendrum inerme* (L.) Gaertn. ^{abundant}

2 80 *Vitex trifolia* var. ^{occasional on limestone rock}

2 81 *Lophura tomentosa* L. ^{common}

2 82 *Artemisia ~~biolineata~~* ^{capitata Thunb.} ^{common}

growing submerged
on sandy reef flat, forming
a sod.

4 83 *Thalassia hemprichii* (Ehrenb.) ^{rhizomes deeply buried}

6 84 *Halodule unnerwis* (Forsk.) Aschers. det. ^{rhizomes buried in sand}

1-2 m



spreading aromatic
herb.

shrub 1 m. tall,
flowers greenish
low shrub; leaves
fleshy.

shrub 1 m. tall;
fruit immature.

shrub 1.5 m. tall; sterile.

shrub 1 m. tall;
fruit white.

low arching shrub

procumbent shrub
with ascending branches.

shrub 1.5 m. tall

(others taller); sterile.

juvenile foliage from
plants with fruiting
part completely dry.

0 m.



Aschers. in

tips round

Gymnodocea rotundata Ehrenb. & Hempr. ↑
Petermann; *Halodule unnerwis* (Forsk.) Aschers.
(one specimen) det. C. den Hartog 1969

C. den Hartog 1969

ex Aschers.

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1956 Ryukyu Is.

Aug. 26 - MCAT Compound,

1 km. s. of Hirara

38485

Codiaeum variegatum Bl.
planted around buildings

40 m.

Hirara and other villages
have rather few trees
planted - mainly
Casuarina, *Garcinia*,
thorns

MIYAKO

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shrub 1.5 m. tall. leaves
variegated, twisted;
flowers white, very
strong ~~the~~ honey fragrance
at night.

Aug. 27 Ikerima

Peninsula with village
a mixture of cultivated
plots with limestone
outcrops with Pandanus
and mixed scrub. Some
planting of Calophyllum.

East of bay is a large
area of salt marsh -
grassland of Paspalum
vaginatum, Panicum
spens, Eleocharis 2 sp.
with some of several
species of Fimbristylis
and one of Cyperus.

The soil is a coarse
shell sand. It is
turned up in places
to make sweet potato
patches, with
drainage channels
between. Sweet
potatoes either
not done or are
all harvested at
this season. It is there

are two dams across the
entrance to the bay, but
one has a sluice which
lets in the salt water
at high tide - also there
are many holes in and
under the dam.

a few small
Rhizophora
mucronata
bushes
1-2 m. tall

The east side of the
island is largely
made up of a sandy
loam or silty sand
soil, intensively
terraced. Along the
coast are large coral
boulders or outcrops,
covered by a dense
Pandanus scrub.

The terracing may
be as much to preserve
water as any thing,
as where there are no
rocks to pile up as
walls there are earth
walls around the rim
of the terraces. In
most places there
seem to be enough
rocks to build walls
and on most eminences
and some slopes there
are remnants of limestone
in place. Most limestone
areas have a scrub
predominantly of Pandanus.
The normal limestone
scrub flora is found
mainly along the stone
walls between fields
and around terraces.
Ficus religiosa, F. religiosa,
F. religiosa are common, also Scaevola.

A large brackish marsh extends east from the bay north of the drained area. At head this is dominated by *Panicum*, lower down by *Paspalum vaginatum*, liberal admixture of *Desman trifoliata*.

Paspalum vaginatum margins the upper part of the bay, backed by a belt of *Pandanus* scrub.

The north coast is lined by a broad belt of *Pandanus* scrub with little else. This also extends around on the west coast south toward the village. Inland south of the lighthouse is a complex of patches of cultivation and of *Pandanus*.

The large depression is occupied by a marsh largely of *Panicum*, bordered by a strip of *Imperata*.

The soil on this side is generally a chocolate brown clay or clay loam.

In the village is a high limestone ridge.

vertical on one side, sloping on the other. The vertical side has little other than *Ficus* retusa and *Piper*. The other side has a forest of *Ficus*, *Diospyros*, *Porteria*, *Pterocarpus*, etc. with a dense undergrowth about 2 m. tall of *Antidesma*, *Randia*, *Diospyros*, a little *Psychotria*, with such vine as *Piper*, *Flagellaria* and *Isoria aculeata*. No *Pandanus* in this.

Plants seen but not collected

Pinus luchuensis

Casuarina equisetifolia

Calophyllum inophyllum

Leucaena glauca

Ipomoea batatas

Pandanus tectorius

Amaranthus spinosus

Euphorbia prostrata

Lippia nodiflora

Aug. 27 - Ikema Shima
east of central inlet,
in large brackish
marsh with coarse
shell-sand soil.

38486
5

Paspalum vaginatum
dominant in most spots

3 87

Cyperus polystachyos (Pott.) J. H. Kern
common

3 88

Fimbristylis ferruginea var. *sieboldii*
occasional to common

3 89

Ischaemum muticum
common in drier spots

2 90

Thuarea involuta (Forst.) R.
common on sandy banks

3 91

Euphorbia charissonis Pers.
occasional on sandy banks

3 92

Panicum polystachyon (L.) Vahl
dominant locally in

6 93

Fimbristylis ferruginea var. *sieboldii*
very common locally

5 94

Eleocharis acicularis (L.) Rostk.
common

2 95

Cyperus polystachyos (Pott.) J. H. Kern
occasional

5 96

Eleocharis acicularis (L.) Rostk.
very common, locally abundant

1 97

Lysimachia mauritiana Lam.
rare on open ^{cultivated} sand bank

3 98

Digitaria
very common on open
cultivated sand bank

2 99

Potamogeton limicola (L.) Macr.
submerged in pools and channels

0-1 m.



culms erect from
dense sod.

(Miq.) Ohwi det. J. H. Kern

Ischaemum muticum (L.) Rostk.

A. (Miq.)

stems spreading;
flowers ~~greenish~~ greenish
culms erect from
deeply buried rhizome.

(Miq.) Ohwi det. J. H. Kern

A. (Miq.)

flowers pinkish white

sterile
mixture of several species, among which a *Potamogeton*, a
Najas and a Characean species. det. C. den Hartog
1969

124

1956 Ryukyu Is.

37500

Chara veglanica

3

common in open channel

3

01

Ruppia maritima L. (fruit) det. C. den Hartog 1969

common in open channel

4

02

Eleocharis

common locally, in water

3

07

Fimbristylis ferruginea var. *nicotiana* (11199) Ohwi det. T. H. Kern

occasional on cultivated

sand bank

2

09

Polygonum

same - in and around cultivated patches of fine sandy loam

2

05

*Commelina**diffusa* Burm.

occasional

1

06

Justicia

rare

1

07

Arachis hypogaea L.

cultivated

2

08

Glycine max (L.) Merr.

cultivated

1

09

Wedelia biflora (L.) DC.

occasional in hedges and

on terrace walls and in

waste patches

3

10

Ficus erecta Thunb.

common in hedgerows on

stone-walls

3

11

Phyllanthus

rare in hedgerows

6

12

Morus australis

common in hedgerows

Ikema Shima

125

0 m.

slightly rough, malodorous.

↓

sterile

5-20 m

↓

prostrate; 3 large
lavender-blue petals.flowers pinkish
decumbent herb; flowers
orange

flowers purplish

decumbent; flowers
yellow; mostly sterileshrub 1 m. tall, figs
green; said to be eaten
when ripe.shrub 1 m. tall;
flowers yellowish.shrub 2 m. tall; ripe fruit
~~red~~ red, pleasant flavored,
eaten.

126

1956 Ryukyu Is.

38513

7

common in hedgerows and waste

1 14

Digitaria chinensis

common in field

1 15

Oxalis corniculata L.

common in field

2 16

~~(grass)~~ *Crabgrass* (Poa) (P. E. A. 16)

common in field

1 17

Amaranthus ~~leaves~~

rare in field

3 18

~~(grass)~~ *Lepidochloa paniculata* (L.) Ch.

common in field

3 19

Dactyloctenium aegyptium (L.) Beauv.

common in field

2 20

Eclipta alba Hook.

common in damp spot in field

2 21

Phyllanthus

common in field

2 22

Euphorbia hirta L.

common in field

5 23

Aster

rare (much more common in brackish marshes)

3 24

Portulaca oleracea L.

common on bare soil

2 25

Anisolema

common locally

1 26

Wahlenbergia gracilis (Font.) A. DC.

rare along trail

2 27

Cyperus compressus L.

common locally in fields

1 28

Sida

rare along trail

29

~~Panicum~~ *Pouzolzia*

rare along terrace wall of earth

5-20-42.

spots

W. A.

D. 1936

W.

W. A.

W. A.

W. A.

W. A.

W. A.

W. A.

W. A.

W. A.

W. A.

W. A.

W. A.

W. A.

W. A.

W. A.

W. A.

W. A.

Ikema Shima

127

flowers deep lavender

culms spreading

flowers yellow; pods erect.

culms spreading

ray white.

erect

decumbent branched herb 1 m. long, flowers white.

prostrate, brownish green.

decumbent to ascending; flowers lavender.
flower lavender.

flower orange.

Panicum (Wight) Willd.

Ishema ^{head of central inlet} ~~Is.~~ ^{on grassy slope of fine}
sandy loam.

38529a *Cymbopogon* ^{very local}

1 30 *Isleria*

rare

3 31 *Leaevola sericea* Vahl
common

2 32 *Oshesia chinensis*
locally common

1 33 *Cassytha* ^{filiformis}
common, mostly grass.

2 34 *Imperata cylindrica* (L.) Beauv.
common, rhizomes deeply buried

3 35 *Fimbristylis monostachya* (L.) Harb.
common

3 36 *Sacciolepis* ^{indica (L.) Stapf}
common

3 37 *Angelica* ? ^{Pandanus japonicus Thunb.}
rare

Aug. 27 Ishema Shima, near
upper part of ~~bag~~
central inlet
in cultivated fields

4 38 *Echinochloa colonum* (L.) Beauv.
common

3

in brackish marsh

5 39 *Derris trifoliata* Lour.
very common

in hedgerows between cultivated

1 40 *Gardenia* ^{javanica var. yodanis}
very rare

15 m.

↓

aromatic when bruised

depressed
rounded shrub 24 m. tall;
fruit white, fleshy.
depressed shrub.

yellowish green

erect

sterile at this season.

3 m.

culms ascending

1 m.

↓

tangled vine, forming
low mounds; flowers pinkish white

atches
10 m.

shrub 1 m. tall, sterile.

- 38541 *Lygodium microphyllum* var. *complanatum*
common
- 2 42 *Sida*
occasional
- 1 43 *Leucaena*
rare in crevices in ^{limestone} wall
- 2 44 *Indigofera linhiensis* Mabino
rare along trail
- 1 45 *Lactuca* *indica* subsp. *typica*
occasional
- 2 46 ~~*Clodendron*~~ *Callicarpa*
occasional
- 2 47 *Vitis lanata*
occasional
- 2 48 *Ampelopsis*? *procumbens* (L.) Merr.
occasional
- 1 49 *Hibiscus tiliaceus*
common
- 1 50 ~~*Camelanchia*~~
rare, seen on only one rock
- 1 51 (*leg.*) *Camellia* *sp.* *var. indica* (L.) Merr.
common
- 5 52 *Callicarpa* *sp.*
rare
- 2 53 *Hibiscus rosa-sinensis* L.
rare, probably persisting from planting.
- 54 ~~*Psychotria serpens* L.~~
~~very common in~~
Aug. 27. *Thema thima* n.w. side
in vicinity of light-house
- 6 54 *Psychotria serpens* L.
very common in Pandanus scrub
- 1 55 *Mallotus japonicus* M.-A.
very local

10 m.



fronds tangled in bushes

flowers orange.

flowers white.

prostrate; flowers
bright red
erect, flowers yellowish white.

shrub 0.6 m. tall, flowers
lilac.

wine; fruits said to be edible

wine; sterile.

flower yellow with
maroon center.

prostrate, fruit black.

shrub; only one flower seen,
cream striated with brown.

shrub 0.7 m. tall, buds
lavender; fruit immature.

shrub 1.5 m. tall;
flowers scarlet.

10 m.



tangled vine, fruit
immature.

shrub 1 m. tall.

38556

(~~leg.~~) *Albizia* *sinensis* (L.) DC.
common in lighthouse yard

3

in hedgerows in
cultivated land south of lighthouse

2 57

Ficus ~~neglecta~~

common

1 58

Phyllanthus?

rare

3 59

Ficus retusa

very common

2 60

Antidesma

occasional

2 61

Ardisia

occasional

4 62

Wikstroemia

common

2 63

Boehmeria ~~retusa~~

occasional

Aug. 27 Ikema Shima
in main village
in forest on high limestone ridge

3 64

Piper

common, only fruiting

where it is sun on bare rock

4 65

Randia

common in undergrowth

2 66

Diospyros maritima

common

1 67

Munaya paniculata (L.) Jack

occasional in undergrowth

2 68

Psychotria linbiensis

occasional in undergrowth

20 m.

prostrate; flowers yellow

15 m.

↓

shrub 1.5 m. tall; sterile;

sap milky.

shrub 1 m. tall; bud only.

shrub 2 m. tall; sterile.

shrub 1 m. tall; flowers

yellowish, ♂.

shrub 2 m. tall; sterile.

shrub 1 m. tall;

buds green.

low shrub; sterile.

20 m.

↓

climber; fruit immature.

shrub 1-2 m. tall;

fruit immature.

shrub 2 m. tall

(others much larger); sterile.

or

shrub; sterile.

shrub 0.8 m. tall; sterile.

- 38569 *Ardisia subcordata* Nag.
common in undergrowth
- 3 70 *Pisonia aculeata* L.
occasional
- 3 71 *Pouteria ferruginea*
common *obovata* (L. f.) Polak
- 2 72 *Aster ~~compers~~*
common
- 1 73 *Hoya carnosa* (L.) R.Br.
occasional, climbing
on rock wall.
- same along roadsides
- 1 74 *Commelina*
occasional
- 1 75 *Emilia sonchifolia* (L.) DC.
occasional
- 1 76 *Lactuca* *radix* *subsp. typica*
occasional
- 1 77 *Vigna ~~sevens~~ cylindrica*
cultivated *Bihon* *oblonga* L.
- 1 78 *Petaria viridis*
common *S. italica* (L.) Poir.
- 5 79 *Boerhavia diffusa* L. *semin lat.*
seen on one rock wall only.
- 5 80 (*oblonga*) *Tylophora zosterifolia* Polak
occasional
- 1 81 (*tit.*)
common
- 4 82 *Croton* *cumingii* Hb.-A.
common
- 3 83 *Vitex* *confusa* *var. simplicifolia* Cham.
on concrete dam

shrub 2 m. tall; sterile.

scrambling, climbing
shrub; branchlets
conspicuously decussate, sterile.
shrub 2 m. tall (other
much larger), sterile.
tree 6 m. tall; sterile

vine, leaves very thick;
sterile.

10 m.

two petals large, blue.

flowers purple, scarcely
exceeding involucre.
flowers pale yellowish.

flower purple.

prostrate, flowers
pinkish, stamens 2-4.
vine: flowers pale
yellow-green.
flowers violet

shrub 1 m. tall; flowers
white.

almost prostrate.
flowers violet.

136

1956 Ryukyu Is.

Aug. 27 - Iheima Shima,
south of lighthouse
in hedgerows in
cultivated land

38584

Morinda citrifolia L.

7

rare

4

85

(celastr.) *Gynura repens* L. var. *repens*
common

Aug. 28 - MCAT Compound,
1 km. s. of Hirara
weed in lawn

1 86 *Alysicarpus vaginalis* (L.) DC.2 87 *Lida*

Aug. 28 "Elephant Cave"
2 km. s. of Hirara

2 88 ~~*Thymus*~~ *A. phyllanthoides* L.
in grassy field

Aug. 30 1.3 km. n. of
~~Hirara~~ Matsubaru

2 89 *Ipomoea pes-caprae* var. *brasiliensis*
sandy area back of shore
common

Isema I.

Miyako I. 137

15 m.

↓

shrub 1 m. tall; flowers
white.

prostrate shrub,
flowers white.

40 m.

↓

prostrate; flowers dull
carmine.

prostrate, flowers orange

30 m.

A. ^{ck} ~~ck~~

very glaucous.

2 m.

prostrate, sub-fleshy;
flower bright purple,
deeper in throat.

Aug. 30 1 km. e. of Takeb^{am}in ~~rice~~ patch between
harvest and plowing

38590

Aeschynomene

common in standing water

1

91

Oryza sativa L.

persisting

2

92

Scirpus

common in standing water

2

93

Barringtonia racemosa (L.)

rare at edges of

(Korea)

94

Criocaulon

occasional in drying mud

5

95

Alternanthera

occasional in drying mud

2

96

Marsilea

common in drying mud

2

97

Potamogeton

occasional in drying mud

2

98

Zoaria?

rare in drying mud

4

99

Scirpus

common in drying mud

38600

Cyperus brevifolius

rare in drying mud

1

01

Hedyotis

rare in drying mud

1

02

Paspalum

rare in drying mud

4

03

Elerchais

common in drying mud

4

04

Echinochloa crus-galli

common in drying mud

corolla yellow marked
with red.

stems sharply triangular.

shrub 2 m. tall; sterile.
petioles red.

creeping; sterile.

heads green

flowers white.

culms ascending & erect.

- 38605 *Cyperus* ^{hagall}
 2 has in drying mud
 5 06 *Cyperus difformis*? L. ^{H. Hara}
 common in drying mud
 2 07 *Limnanthemum*?
 common in drying mud
 5 08 *Fimbristylis miliacea* (L.) Vahl
 common in drying mud
 09 ~~*Polygonum*~~

same - weedy roadsides
 and waste places

- 2 09 *Polygonum* ^{sp. from Hara}
 moist spot
 1 10 *Physalis* ^{angulata L.}
 2 11 *Ipomoea littoralis*
 common ^{T. Hara}
 3 12 *Cassia tora* L.
 occasional
 1 13 *Verbena officinalis* L.
 occasional
 1 14 *Ampelopsis* ^{brachyloba (Thunb.) Kaneh. & Suda}
 occasional ^{Hara}
 1 15 *Wedelia chinensis* (L.) DC.
 common
 2 16 *Ageratum conyzoides* L.
 common
 3 17 *Bauhinia* ^{japonica Thunb.}
 occasional on stone walls
 2 18 *Momordica* ^{dissecta L.}
 on stone walls
 2 19 *Leucaea*
 occasional

20 m.

flowers white.

flowers pale greenish
 yellow

flower rose purple

flowers yellow

flowers purple

climbing in bushes.

fruits dull blue.

decumbent, flowers
 yellow.

highly aromatic;
 flowers white.

wine; flowers
 pale yellow.

fetid wine.

prostrate; flowers
 white.

- 38620 *Solanum nigrum* L.
rare
- 3 21 *Polygonum* (long stem 31 Brong.)
common
- 5 22 *Commelina benghalensis* L.
common
- 2 23 *Mirabilis jalapa* L.
around old building
same in ~~around~~ deep pool
among ~~low~~ rice patches
- 2 24 *Jussiaea repens* L.
abundant
- 2 25 *Najas* sp. ~~parvula~~ Del.
abundant, submerged
- 3 26 *Ceratopteris thalictroides* (L.) Brong.
occasional, submerged
except tops of fertile fronds
- 2 27 *Marsilea quadrifida* L.
common, submerged
- 2 28 *Potamogeton crispus* L.
common, submerged
- 1 29 *Utricularia* ~~sp.~~ ~~sp.~~ ~~sp.~~
common, submerged
same on low ridges between
rice fields
- 1 30 *Cupatorium* ~~pubescens~~ ~~Willd.~~ ?
common, on limestone
- 1 31 ~~pass~~ ~~sp.~~ ~~sp.~~ ~~sp.~~
rare, on limestone
- 3 32 *Scleria* ~~sp.~~ ~~sp.~~ ~~sp.~~
common on clay soil

flower white.

erect, flowers pink

stems ascending
flowers deliquescent
in afternoon.
flowers rose.

15 m.

↓

extensively spreading
over surface of water,
floating organs
white, spongy, sterile.

Brong.

sterile

det.
C. den Hartog 1969

sterile.

sterile.

15 m.

↓

flowers white, with
strong honey fragrance.
erect

144

1956 Ryukyu Is.

38633

Lactuca ~~indica~~ *typica*
occasional on clay soil

2

1 34

~~(leg.)~~ *Desmodium* *heliconiae*
rare on clay soil

5 35

Pteropodium *cernuum* L.
very local on clay soil

Aug. 30

west of ^{Nakazone} ~~Kanbu~~

5 36

Fimbristylis *debatensis* (L.) Vahl
on dyke between rice fields
very common

Aug. 31 Hirara

3 37

Boerhaavia *mutabilis* R. Br.
in crevices in stone wall

MIYAKO

145

erect

flowers purplish.

15 m.

det. J. H. Kern

5 m.

Sept. 2 - South of Kadana
 Ai. Base. Camp ~~Chata~~ ^{Chatan} ~~Kue~~ ^{Mura}
 Naha ~~gami~~ ^{gun}

Group of limestone knobs
 or pinnacles.

Southmost large
 one with summit very
 rough and dissected into
 a number of beached
 holes with pinnacle-like
~~is~~ fragments of rims.

On lower slopes pines and
 Miscanthus. rough part
 with *Ficus* *parvula*, *F. virgata*,
F. wightiana, *F. erecta*,
F. retusa, *Toddalia*, *Prunus*,
"Perezia", *Morus*, *Zanthoxylum*
ailanthoides?, *Boehmeria*, *Ardisia*,
Hoya, *Nephrolepis*, *Amilax* *Maytenus*
Paederia, *Clematis*, *Calandula*,
Cinnamomum, *Presnna*,
Lycopodium.

Another knob nearer the
 sea is essentially similar
 in structure, a dissected,
 buttressed summit not
 so much vegetated as
 around this one, and with
 more saline influence,
 as evidenced by abundance
 of *Ilex*, some *Acacia*.

Another knob - between
 the road and the browsing
 area actually seems to
 have a chimney structure,
 though the greater part
 of the rim seems to be
 missing, broken down, or
 replaced by concrete.

Sept. 14 - S.W. slopes of
Mt. Schroeder, above
Merizo Annex - edge
of Conservation Area
no. 3.

Mixed *Dimeria* and
sword-grass, with
considerable *Heteropogon*.
Erosion scars, many
of them eroded down
to white compact tuff.

Valley has ravine
forest with coconuts in
lower part, also areas.

Terrace on lower part
of ridge looks as
though lightly forested
some time back.

In the ravine forest
dwarf-dog seems dominant
at lower elevations,
drops out about half-way
up.

On top of a spur between
main wooded valleys
is a patch of well-grown
Leucaena 4-5 m. tall,
with abundant
seedlings. Seems to be
on weathered tuff but
proper investigation
impractical on this trip.

Sept. 14 - Cross Island Road
Conservation Reserve #3.

A road goes in from
the main corner, then
ramifies some. Area
said to be used some as
marine maneuver area.

Some conspicuous erosion
scars, worn down
mesitas, etc.

Extensive erosion scar
communities on flat to irregular
ground. Plants:

Dimeria chloridiformis
Ischaemum sericeum
Myrtella bennigseniana
Cladium
Dianella
Rhynchospora rubra
Wikstroemia
Geniostoma micrantha
Melastoma
Casuarina equisetifolia
Gleichenia linearis
Decaspermum fruticosum
Phyllanthus californicus
Schbrenneria? or *Rhynchospora*
Timonius albus
Blechnum orientale
Cassytha filiformis
Waltheria indica
Andropogon brevifolius
Chrysopogon aciculatus

Sept. 14 east of Apra Heights

38:38
2

Lianella
common in erosion scars
in savanna or volcanic soil.
Sept. 15 Anao

solution or "worm algal"
terraces here have
pot-holed bottoms. Soft
algae abundant, corallites
inconspicuous or absent.

Depth of water up to
20 cm. in notches,
to 50 cm. Bottoms fairly
flat except pot holes.

Higher terraces are on
outer margins - a few
basins back of them.
Explanation probably
more complex than commonly
thought. This would
be an excellent place to
study them.

Sept. 15 - Cliffs above Anao

39

Melochia

rare in low scrub on cliff top

Sept. 15 - Anao

2

40

Leucaena moulana var. *guamensis*
occasional in edge
of *Casuarina* just back
of low littoral scrub

flowers and ripe fruit
white.

shrub 0.7 m. tall; ~~petals~~
purple with white tips.

shrub up to 1 m. tall,
flowers white.

152

Q1

153

Q1

Sept. 18 - Air trip - Oahu to Hills.

The lower slopes on leeward Oahu seem to have been taken over very largely by *Leucaena glauca*, which forms a scrub about 3(-4) m. Tall, brown because of rods at this time of the year. This seems to have crowded out much of the *Rantana* and *Ikentia* and even some of the *Prosopis*.

The slopes above Honolulu have some patches of *Casuarina*.

West Molokai, at least the south slope, as well as the southeast slope of East Molokai looks very red. The amount of actual bare ground showing would make it necessary to class much of this land as desert. Around on the south slope even the lower slopes are greenish. There do seem to be a few *Leucaena* on the upper part of this slope but too far away to be sure.

On n.w. Lanai there are still large red wind-erosion scars. The rest of Lanai

completely covered by clouds, except one bit of east end, which also has serious erosion scars, as well as a strip of *Prosopis* just back of coast.

Lower slopes of W. Maui are all cultivated except a very hilly section just north of s.w. corner, and the steep slopes just east of the s.w. corner. There is a belt in s.w. gulches. Vegetation on s.e. slopes very thin - slopes are reddish from ground showing through. No tree for a long way up, 3-4000', except in gulch bottoms. South point of W. Maui is steep and barren.

About half of Kahoolawe is red wind-erosion scars, other half scrubby *Prosopis*, etc.

The lava flows on south west corner of East Maui are dark brown to black, showing almost no signs of vegetation. Some small *Leucaena* should be looked at. May harbor relicts of pre white-man vegetation if lava is not crossable by cattle. East of this the flows seem

mostly to have some grass. Some are still ~~very~~ blackish. Eastward the vegetation is more and more marked. Few or no trees up to cloud belt about 1/2-1/3 way up. Slopes extremely ~~to~~ dry and barren east to Kaupo Gap, trees only in ravines and not prominent there.

Floor of Kaupo gap is greenish with some conspicuous dry grassy areas. North of this the slopes are wooded, with Kului in lower ravines. Lowest slopes are grassy *Lantana*.

Waimea Plateau on Hawaii almost entirely grassy.

and other scrubby wood.
Along Hamakua coast the Kului ~~is~~ lines the gulches crossing the sugar land, down practically to sea level. Sea cliffs and many tops of gulch walls lined by *Lantana*.

Still large stretches of unbroken forest on Mauna Kea slopes above sugar land.

Pits of snow about summit of Mauna Kea.

Sept. 18 - Wright Road, about 3 miles n.e. of Hawaii National Park Hq.

3500'

A large kipuka of Glendale ash, being cut up and cleared for farms. The soil is 20' or more deep. Black on the surface and upper layers, yellow-brown with pelagonite below. The vegetation is a sparse forest of *Metrosideros* 20 m. or more tall, with a few other trees - *Xylocarpus* ^{*Chrysodendron*} etc. A complete understory of *Cibotium*, mainly *C. glaucum* (or *C. chamissoi*) 4-5 m. tall. The trees are round topped, umbrelliform, with many of lower parts of trunks compound. The *Cibotium* have very long fronds in comparison with trunks.

Epiphytes very abundant on many of trees. *Asplenium*, *Uncinnia*, several species of *Elaphoglossum*, *Asplenium*, *Polypodium pollicidum*.

and many *Bryophyta*. Even *Rubus hawaiiensis* is an epiphyte here. *Pipturus* is scarce in the woods, common along the road. Terrestrial ferns also common.

The road has been opened since 1952. *Paspalum durvillaeum* abundant along much of the road.

The understory of *Cibotium*, more or less developed, seems to be a widespread feature in these forests, due perhaps to the open canopy.

Sept. 18 - Wright Road, 3 mi. n.e. of Hawaii National Park headquarters. Metrosideros forest with *Cibotium*.

38641

2

Uncinia

epiphytic on tree trunk, common

3

42

Thelypteris?

local, terrestrial

Sept. 19 - Volcano Road -

A small *Dendrobium* (?) has become very common along lower part of road above Hilo.

Large tract of forest here a great mixture of introduced trees and shrubs, sown by airplane after a fire some years ago. Now being gradually cut down and turned into plantations of *Passiflora edulis*. 1. and 2. are common along road. - vines strung up on wires. Yellow fruit.

scapes pendent

rhizome on surface of ground, fronds arching to erect, 1.5 m. long, indeterminate.

Sept. 19 - Saddle Road hospital above Hilo ~~trunk~~ ^{beyond hospital} ~~above Hilo~~

~~Melastoma~~ ^{Melastoma} has become very abundant. In this entire area a large *Nephrolepis*, probably *N. hirsutula*, has also become very abundant. *Quercus superba* established.

Pahus javanica is dominant along roadside in Kaunama area. Above this, a tall *Andropogon* (like *A. scoparius* but taller) abundant along road.

Above this (2000')
 patches of lehua forest
 of various sizes, some kōa,
 areas of newer lava
 with bushy lehua and
 abundant *Cladium angustifolium*
Gleichenia, etc. This is 1881
 flow, others a little older.
 Apparently as forest gets
 older *Gleichenia* gradually
 dominates under story,
 then *Cibotium* may crowd
 it out, at least in some
 sites.

Much country with
 scattered lehua 3-4 m. tall,
Cladium, *Sadleria*, etc.
 around Halfway Point.
 Some patches of larger,
 much denser lehua forest,
 perhaps 15 m. tall. Lehua
 here very uniform
 dark gray-green one with
 light young growth, very
 pubescent.

1855 Flow is rough, as
 covered by a *Gleichenia*,
 scattered small lehua
 bushes, widely spaced, 1-2 m.,
Sadleria, *Vaccinium*, little
 else. Parts of this even
 more barren - scarcely
 any lehua or *Sadleria* - a little
Dicranella and *Vaccinium*, *Polypodium*

The part near the top of
 the saddle has not
 even lichens. The 1935
 pahoehoe overlapping
 this in the saddle has
 a little vegetation in
 cracks, but is essentially
 bare.

Pinnacle, a small cone in
 saddle near Humuhumuhua,
 is wooded with some
 sandalwood, etc. is surrounded
 by 1935 pahoehoe to form a
 kipuka.

Cones in saddle are
 andesitic Mauna Kea cones,
 surrounded by basaltic
 Mauna Kea lava, such as
 1935 pahoehoe.

Off of lava is a savanna
 with *Myoporum*, etc.
 small rounded trees.
 On far side this becomes
 almost continuous forest or
 scrub woodland of
Sophora and *Myoporum*.
 Seems to be in fair shape.
 Much bare as in this
 slope in saddle - 1843 flow.

Plants very abundant
 and almost dominant in
 flat ground near Pihalekua.
Phenacodium abundant - as
 about *C. vulvaria*.

change downward into mixture of *Chenopodium oahuense* and *Trisetum*? the grass taking over gradually downward. This on flat and on lower slopes.

Downward the *Hypoxylon*, *Sophora* and *Dodonaea* gradually come in.

Trisetum gradually changes to scrub locally. Much savanna locally also.

Then mostly weedy pasture with scattered patches of trees stretching to Waimea. - 6000' - 5000' above Waiki. At Waiki large *Eucalyptus* and *Cupressus* grow.

Some areas of sparse scrub of *Dodonaea* at 4000' and lower. This becomes more extensive down toward Waimea plain, also denser but of lower stature.

Above 1-2 m. lower down up to 1 m. Below this a thin scrub of *Sida* & *Calla*. Much scattered *Opuntia*. Evidence of extreme over-grazing.

See slopes of Kohala Mt. of grass. Forest boundary very

at night.

Opuntia said to be held in check by cochineal.

Much *Eucalyptus* around Waimea.

From Waimea toward Kona the slopes along road are covered by a low scrub of *Dodonaea* with locally some *Sida*. In some places grass with scattered *Opuntia*, or *Sida* with *Opuntia*. Then solid slopes of *Sida*.

As slopes get rougher (but not steeper) cactus and *Dodonaea* become more abundant, locally one or other dominant. Few trees, occasional *Prosopea*.

Then *Savanna* of *Leuca*, *Diospyros*, *Opuntia* with *Pennisetum* near Puu Kuaiaho gradually changing to a well-developed *Leuca* wood land.

All on a large. Then more open savanna.

'89 ad flow has lichens, thin grass.

Beyond this mixed savanna and cactus opposite Puu Waawaa. Much *Melia*, some *Samanea*.

another terrace is andesite.

Below this is lehua savanna with some admixture of other trees. Everywhere Pennisetum, a little Leucaena.

Open areas of cactus and Pennisetum. Areas of savanna of rather small trees - Diospyros, lehua, etc. Some kukui in low spots and ravines.

Some open grass without cactus but some Lantana.

Occasional Erythrina.

General stature about 3-5 m., spacing 5-10 m.

Many species but mostly lehua and Diospyros.

Some miles of this, rather continuous. Interrupted by ~~fresh~~ relatively recent aa flows - Kaupulehu flow with a little scattered grass. Mixture of exposure of pahoehoe that is very glassy, many collapsed tubes, then later fine aa in channels.

Then more savanna and woodland mixture.

the lehua ranch area - wooded with Grevillea, Jacaranda, Schinus, Corbintiafolia, some kukui etc. Open woodland with closed forest patches.

up to 20-25 m. - thick guava, some mango.

Open areas, some guava brush. Kalava area.

[at Waiohine, south end, Schinus Corbintiafolia has become a plague, efforts to control it with herbicides]

Kukui becomes more abundant as the road goes downward.

Coffee begins - no shade trimmed to about 3 m. near Monakahean.

Like down to Kailua a luxuriant mixture of guava, mango, kukui, Casia, etc. Large areas of sisal. Flower stems harvested for ornamental fencing. It is mixed with Schinus, Lantana, etc. Downward replaced by Lantana, more and more Prosopis which forms a loose thorn forest with solid bush layer of Lantana.

on lower slopes, below this around Kailua the Lantana drops out.

Beach road south of Kailua through Prosopis forest, roads at least lined with Leucaena 3-5 m. tall. Apparently some of it scattered through forest. Definitely volcanic soil. Some Lantana.

Southward the kiawe is largely replaced by Pithecolobium, Samanea, etc.

Then a lava with some scattered Leucaena, Waltheria, various weeds. Some Capparis. Polypodium.

Slope above Kailua and to south on older lava has Samanea, Leucaena, Kukui, Lantana, Oenocarpus indica, etc.

Southward on main road some 15-20 m. lehua forest, sparse. Then more secondary scrub. Coffee plantations. Scraps of lehua forest. More or less solid coffee over large areas near Kainaliu ~~Kainaliu~~ Kainaliu. A Milius sapida tree ~~is~~ along road near hospital.

Coffee continues through Kealahou, through Kona, for several miles.

Flat southeast of Kealahou is at base of fault scarp covered by flows. Pinches off southeastward. Kukui is abundant well below road, also common at level of road.

After the coffee there is a large area of guava-Schinus scrub with mango trees, some patches of avocado and coffee. Some Samanea, Kukui. This around Hookea. Beyond here strips of pasture and of mixed forest of kukui, Schinus, guava, etc. some coffee.

Then an area of ragged lehua forest with guava, Lantana, Schinus undergrowth, changing to scrub with dropping out of forest trees.

Then bare 1950 lava flow. A few ferns near road.

Beyond here the scrub is lower but still very green. Santana, guava, Scheuchzeria, etc. for a couple of miles. Then a large patch of well-developed thick lehua forest perhaps 25 m tall. Some clearing and planting of coffee. Scrub, scrub forest, lehua forest, clearings, another lobe of 1950 aa flow, etc.

This aa is bare except near road, where weeds and ferns are coming up on somewhat compacted lava.

Forest beyond flow is Kipahoe forest reserve is thick lehua 20-30 m high. Not much understory, except ferns. mostly Nephrolepis.

Beyond this the 1910 flow. Then more ragged woods. Patches of guava scrub interspersed. This also an understory.

1926 flow has lichens and bushes.

Some coffee being put in even beyond Kipahoe flow (1926). General vegetation guava scrub with patches of lehua and lehua. Some large open lehua. Second story is guava scrub 2-5 m tall. A considerable extent of this, varying from very open to closed forest, from 2-3 m to 30 m tall.

Some rather extensive aa flows with widely spaced small trees. The 1907 aa flow has lichens and a few small bushes. Some Tournefortia locally.

At about 78-80 mi from Hilo the forest gives way to open aa with only scattered trees. 1907 flow looks very fresh - aa with no vegetation - very rough. 1887 flow has almost no vegetation except perhaps thin lehua.

Open woodland, mostly lehua, with grass and bushes. Beyond here, changing to savanna. Then a Kipahoe flow.

with *Sadleria*, low bushes, etc. around Paluwe Road. Some smooth green pasture here.

Here more *pahoehoe* with thick bushes of *lehua*. Then some miscellaneous introduced trees. Some good sparse *lehua* forest at and beyond South Point road. Also patches of *Eucalyptus*. Large area of solid *Schinus cerebinthifolius* up to about 5-6 m. tall, very dense. In on slopes and coastal flats near Waiahi.

Some sugar cane bet Waiahi and Waalehu. Some *Leucaena*, also, and open pasture land.

Beyond Waalehu much open pasture, very green, mostly *Panicum maximum*.

This is a large exposure of yellow-brown *Pihale* ash. Slopes gently to flats along coast.

North of ~~Pihale~~ ^{Waalehu} a rough lava flow, then a large area of open pasture with much *Leucaena*, locally abundant *Samanea* trees. Interrupted by

somewhat younger flows. Much of the pasture is *Leucaena* and much of it covered by *Leucaena* scrub.

Coastal flats below are barren black lava.

Area becomes more and more bushy, much *lantana*, *lehua* fill valleys.

Large hoist blocks up slope on left. Some more pasture on hills. Large patches of planted *Eucalyptus*. In some rocky strips, *Samanea* is dominant. Near Pihale large areas of bushy pasture, abundant *Samanea*, rows of *Eucalyptus*. Some good pasture, some *lantana*.

Gradually changes to *lehua* woodland, *lehua* 5-8 (10) m. tall, some grass, mostly *lantana* between.

Then *pahoehoe* with low native scrub with scattered *lehua*. Large area of this, but with some pasture and much cane above road. In areas of open *lehua* with native shrubs such

as *Styphelia*, ~~etc~~ *Dodonaea*,
small *Lehua*, etc.

Then a considerable area
where first *Grevillea*,
then *Lehua* woodland
have most of trees dead
at tops. Have been this
way for years, see
Wentworths. Actively
growing from bases.

Large stretch of
palaoehoe with sparse
scrubby bushes and
locally small trees mostly
Lehua. Some extensive
pastures up the slope.
Dodonaea scrub above
palaoehoe and below pastures
locally. Apparently
slopes above pasture are
wooded, but not seen well
from road.

Marsh low brush
and patches of *Lehua* wood.

Park boundary. Inside
extensive aa fields with
scattered *Lehua* scrub.

Escarpment - *Kiiki* fault -
above road. covered by
low scrub. above the
aa fields. This aa is
the Kan desert.

With change to *palaoehoe*
trees get sparser but larger

and low scrub between
gets much thicker

Sept. 19 - just north of Kuaiaho Cove,
south of Waimea
in sclerophyllous savanna

- 386113 *Pennisetum*
dominant grass
- ② 41 *Xylocarpus*
occasional
- 7 45 *Diospyros ~~persea~~ ^{persea}* is
very common
- 3 46 *Diospyros ~~persea~~ ^{persea}* var.
very common
- 2 47 *Chenopodium vahuense*
very common

48

Sept. 19 - Humuula saddle
on lava rock along road.

- 5 48 *Sicyos*
local

Sept. 19 - Kaimanu section,
Hilo

- 4 49 *Osbeckia Melastoma malabathricum* L.
abundant in waste places

Sept. 20 - Lava Tree Park, Puna
small shallow valley
with standing tree molds
up to 5 m. tall. Some are
clearly *Metrosideros*. The
by 1800 flow. Lava cooled around
trunks, then liquid drained
off or shrunk away from loss
of gas.

caespitose

- small rounded tree; flowers
greenish.
- small rounded mound-like
tree.
- small rounded tree;
fruit not ripe.
- shrub 1 m. tall, with an
unpleasant odor.

700 m.

extensive vine, inflorescences
erect, flowers white.

shrub 2 m. tall, flowers
bright rose pink.

Sept 20 - Original vent
of 1954 eruption

Slaggy palaochae in
transition to a black to
reddish. *Nephrolepis* and
Ecklonia *guineensis* ^{smallish like 3 out of 4}
well established near edges.

In actual vent *Nephrolepis*
sporings abundant, mostly
in sheltered situations.
from minute to fronds several
inches long. Out on open
lava field no vegetation
except sporings in crevices
where they are ~~also~~ frequent.
Nephrolepis is probably
N. exaltata.

1) Stys intermediate area ^{low}
ropy lava with much
pumice on surface in places.

On normal areas there
seems to be no vegetation
at all in full sun.

Many sporings up
to several inches long in
deep crevices.

In places compacted by
bulldozers *Cyperus* sp., *Fimbristylis*
cymosa and *Digitaria* sp. ^{in places}
have taken hold and are
fruiting.

very rare to have bulldozed

a road directly through
the study area.

The *Digitaria* and *Fimbristylis*
are really growing on a glob
of soil brought by tracks of
bulldozer.

Where Kaulaean flow
reached the sea it is all a
very rough and broken, though
there are a few palaochae. The
large boulders apparently floated
down on the flow.

The small pond enclosed by a
high bar of black gravel is
reduced to about 3 m across at
widest. No fish seen, no crab.
no vegetation evident in it on
new lava. The gravel is surprisingly rounded.

When flow lobe protrudes
out into sea it is hard to
distinguish new lava from
old. Much rounded beach
material has been thrown back
onto the rough surface. The
large boulders at and below
high tide level are thickly covered
by algae, but may well be
the old rock.

The clincher surface
above high tide clear back
is absolutely free of macroscopic
vegetation.

at W. end of study area. it is
from fresh lava.

Surrounding forest on one side of flow largely *Pandanus* with *Thespesia*, *Samanea*, *Metrosideros*, *Guava* etc. other side dominantly *Metrosideros*, some *Pandanus*.

Keehee - low - just above road a tiny pit in biphukas with remains of large dead tree knocked down, a small *Pipturus* bush 1.5 - 2 m. tall and a great *Canavalia* vine growing out of pit and covering a good sized patch of aa. Also a dead *Cassipoula foetida*. Makes a green patch in lava. The lava is aa but with large pahoehoe blocks floating in it.

Kehena Flow - rough aa. New beach and beach ridge formed in Doty's study area. Pebbles again surprisingly rounded. No vegetation either on beach ridge or on aa ^{in the low area} ^{at the back of beach}. On point a hard columnar layer ~~is~~ reaches to above high tide. This, in places, has a thick growth of algae. None of the rough lava,

when it reaches the water, seems to have anything. The flow has many biphukas - even almost down to the water's edge.

High point of upper road where it crosses flow - a mile or so below - conspicuous. Even here the lava is very rough aa. No vegetation seen except a few tiny fern seedlings down in holes.

This flow cut through a *Metrosideros* forest. The edges and smaller biphukas have dead trees, often with some green branches.

Kamalii - fresh lava still learning a good bit. In abundance of *Nephrolepis* even fair sized, growing on new lava here.

At the house the earth cracked and sulfur-laden steam issues from cracks and holes, as well as from vents from which lava issued. Crystalline sulfur is being deposited around all holes and cracks, some assuming a beautiful fine

branching form. The steam apparently contains S vapor but not a very little. 562. A collapse pit about 80-100' across and 150' deep, vertical sides below-house in old lava.

Trees here killed or defoliated by fumes (SO₂) on ^{south} side trunks are now putting out a profusion of short branches resulting in a Lombardy poplar aspect.

On ground dominated by heat and steam by ferns sp. *Nephrolepis* sp. *rectilata* *and* *hemisphaerica* *Nasopalm* sp. *Digitaria* sp. and all colonizing the old lava. There has a few *Nephrolepis* and a profusion of seedlings in crevices.

38650 Sept. 20 just northwest of Pahoa, Kauai 650
#3 *Lobelia arundinacea*
common in grassy roadside

4 51 Sept. 20 Kamali, 3 miles south of Pahoa 1050
on broken lava in open, near steam vent
Andropogon
very common

52 *Nephrolepis multiflora* det. Jarrell, 1976
very common

erect, stiff, flowers with white petals, purple lip.

caespitose, very erect.

bracts erect, often much larger.

38653 *Cyperus*
3 very abundant

Sept. 20 - Halekamauna,
11.5 miles east of Pahoa

in compacted area on fresh lava

54 *Digitaria*

one plant on bit of soil

55 *Cyperus*

occasional

56 *Timbristylis cynnosa*

rare, one plant on bit of soil

Sept. 20 - Lava Tree Park,
east of Pahoa

57 *Drymaria*

weed in trail

Sept. 21 - Air trip, Hale to Honolulu.
Cloud layer hanging half way
up south slope of Haleakala.

Considerable grass on lower
slopes above Hana. But lower
part of Hana Gap is brown
and dry. A small black
flow that looks very fresh
is cut by waves, at west
end of gap. Low cliffs cut
in most of the rest, as well
as along coast west of this.

Lower slopes west of gap
a series of dry, somewhat
grassy flows, apparently

400

prostrate, flowers white,
~~petals~~ pedicels glutinous,
detaching at maturity.

no trees along this entire
coast

Lower west slopes below
Kula are Prosopis forest. Much
~~green~~ green grassland and
planted forest (Eucalyptus?) around
Kula, about 1/3 - 1/2 way up mountain.

South-east slopes of West Maui
are very dry, brown, no trees up
3/4 the way. Sotomier all on sugar
cane on flats on south side of
base of West Maui.

Kuhui forest back in deep
valleys, with other forest above,
but outer slopes and ridges dry

650

up at least $\frac{3}{4}$ the way
congruent slopes above
and beyond Lihaina mostly
in sugar, possibly some
pineapples but coffee won't
be seen.

Slopes of Lanai toward
Maui Channel are mostly
bare red erosion scars, some
dry grass, briars along
coast and running up ravines.
I was running down one
of the flat topped ridges,
probably the one Munro
mentioned over the top.

Lower parts of slopes have
more grass than upper parts.
Wind grooving very prominent
in briars forest along
north coast. Brought out very
prominently by sand in
western part where almost
parallel with coast.

On West Molokai the
Mormon land strip seems
to have practically vanished,
but perhaps we are too far
away to see it. Large bare
red wind erosion scars on
southwest slope.

West point has sand dunes.

Oct. 22 - Honolulu
Dinner head -

Went with G. Munro
to examine his dry-land
plant garden.

The slopes are very dry,
no sign of any moisture
at all. Vegetation is sparse
Prosochia more developed
in ravines. Thin grass
ground cover is common to
dry. Many open areas and
some of sparse low-lying
woodland filled with
Leucaena scrub. This
is about 2 m. tall. The Munros
are trying to clear it out
by hand and by chemical.
Also are killing some Prosochia
with chemicals.

Munro has been planting
seed of all sorts of dry country
native plants here. Figures that
with seed in the ground
a good rainy season will
bring out the plants. Erythrina
sandwicensis ~~with~~ has come
up commonly throughout
area, not only in the garden
itself, but generally on the
slopes. Lipochyta sp. is
common, native here. Several
plants of Hibiscus brackenridgei
from Lanai are growing well.

One large plant of *Jatropha gossypifolia*, base of leaves, seen. Munnis seems to value it.

The theory behind this reservoir is that the extreme drought, will eliminate all except the most drought resistant species. This is undoubtedly correct.

Rainfall here is about 5" per year, acc. Munnis.

In areas where water is so scarce its availability may actually become an effective single factor cont. of vegetation. Other factors may even exert influence only through effect on availability of water.

Sept. 29 - Coast Ranges between San Francisco and Santa Barbara, from air. Traversing hills along inland side of Salinas Valley show a remarkable drainage pattern - apparently the main drainage - line, one determined by the bedding of the Monterey (?) formation. The finer drainage seems to be at right angles to the main valleys or ravines, whatever their direction.

Higher parts of these ranges are chaparral covered, but with considerable interspersed grassland. Should be very interesting for study, especially in spring.

All hills here have a peculiar rounded contour, no sharp breaks or escarpments. Most ravine bottoms also rounded, but some sharp.

Erosion scars in a grassland showing white man's have thin chaparral.

1956 California

E. a. to Redlands by Metro Bus.

Sept. 30 - Bet. Los Angeles and Pomona, along Garvey Ave. Walnut grove seem in rather poor shape, but may simply be lateness of season.

Bet. In Puente Hills are some citrus groves. These are mostly in very poor shape. The branch tips mostly dead, some tree largely dead.

There is some open woodland with *Quercus agrifolia* and, probably, *Q. engelmannii*.

Opuntia abundant only on one fenced camp on hills just outside Pomona City limit.

Smog so bad today that mountains are completely obscured from entire Garvey Ave. route L. A. to Pomona - not a glimpse except from pass over Puente Hills, where Cucamonga and Ontario peaks were visible. Forest fire, probably contribute to smoginess.

Low mts. visible from S. La Verne Ave. above Pomona but nothing to be seen to east of this, above Claremont. Low Cucamonga Peak, and ghostly outline of summit.

Ontario and Cucamonga peaks.

Citrus groves here are mostly in bad shape, with much dead wood. Some, however, not in such bad condition.

Blanchard Park seems still to be in fairly natural condition, but shows some signs of disturbance.

The wash east of Claremont on 6th is still in more or less natural state in limited area, with *Lepidospartum* brush.

Toward Upland the younger orange groves seem in fair shape, but older ones in very poor condition.

East of Upland on San Bernardino Rd. is still some scrub area, with *Lepidospartum* in washes, *Eriodictyon*, *Eriogonum fasciculatum* etc. on flat.

Much active subdivision going on, esp. around Cucamonga. Extensive vine yards to east seem in good condition. Rather yellow at this season.

(Oct. 1, 1941)

190

1996 Coll. Tokyo

Aug. 7 - MCAT compound,
1 km. s. of Hirara14 *Hedyotis*

Aug. 10 - Hirara

15 *Commelina diffusa* Bl. det FRPAug. 11 MCAT compound, 1 km. s. of Hirara
around compound buildings2 16 *Youngia japonica* (L.) DC.4 17 *Lactuca*1 18 *Emilia sonchifolia* (L.) DC.~~19 *Londra*~~1 19 *Londra*Aug. 13 near MCAT, 1 km. s. of
Hirara

on low limestone hills

5 20 *Bauhinia*2 21 (~~conf~~)2 22 *Digitaria henryi*5 23 *Premna*1 24 (~~schid~~)5 25 *Cassia mimosaoides*5 26 *Apium* ~~conf~~ *leptophyllum* (Perr.) F. Muell.3 27 *Carmena retusa*1 28 (~~conf~~)5 29 *Antiderma?*6 30 *Phyllanthus*3 31 *Callicarpa*4 32 *Rhynchosia*1 33 *Lysmachia mauritiana* Lam.

Miyako? Ryukyu 191

40 m.

prostrate flowers white

decumbent, flowers
white, two petals large.

40 m.

↓

— flowers yellow
— flowers pale yellow
— flowers purple, little
exceeding involucre.
— flowers pale yellow

40 m.

↓

— vine, flowers pale
— greenish yellow
— disk dull whitish.
— leaves glaucous green.
— fruit green
— flowers white, fragrant.
— flowers yellow.— flowers ^{pinkish} white, anthers deep purple.

— flowers pale green.

— flowers lavender-pink
— vine; flowers yellow.

Aug. 16 - Hirara
around waste places in town

- 34 *Setaria*
 35 *Digitaria henryi* ? Rendle
 36 *Amaranthus spinosus* L.
 37 *Amaranthus spinosus*
 38 (~~grass~~) *Lepidosiphon* (Hutch.)
 39 *Eragrostis multicaulis* Steud.
 40 *Sisymbrium* ?
 41 *Hibiscus*
 42 (~~asclep.~~) *Ipomoea*
 43 *Tridax procumbens* L.
 44 *Phyllanthus*
 45 *Bidens pilosa* var.
 46 *Cyperus rotundus* L.
 47 *Setaria viridis*
 48 *Lepidium virginicum* L.
 49 *Plantago*
 50 *Amaranthus*

Miyako, Aug. 21, 1956 coll. D.B. Doan

- 1 *Podocarpus macrophyllus* (L.) Wack. = *P. neriifolia* (L.)

Miyako, Aug. 30, 1956 coll. R. Hetzler

- 1 *Euphorbia neriifolia* L.

5 m.
↓

decumbent, glaucous.
stems red
stems green

flowers yellow
flowers red.
flower yellowish-green.
rays yellowish.

rays white

petals minute, white.

stems reddish

Feb. 10, 1956 In Fontana
even the Eucalyptus trees
in vicinity of steel mill
have dead tops. The
odor, for several miles,
is quite disagreeable. The
effect on Eucalyptus
shows very much better
in Fontana city, several
miles east and east-northeast.
This effect is rather
irregular and, of course,
may possibly have
nothing to do with the
mill fumes. Noticeable
eastward along Fort Hill Blvd.
Fades out just inside
Rialto city limits, but still
visible 2-3 km. or so south
almost into Rialto proper.

Localized very bad Eucalyptus
just outside San Bern Co. line
but may be attributed
killing with chemicals, as
only certain rows affected.

Santa Ana River - Bed between
San Bern Co. line and **Fontana Linda**
has evidently been recently
burned. Vegetation is mainly
Salsola kali & *terrestris*
and dead *Populus* (?) trees.

A few low Eucalyptus seen
with a dead upper branch of one.

In *Persea* *pinella* this
become noticeable but
no means serious as
in Fontana.

Citrus, as well as much better
shaded, but dead tops
still quite noticeable.

Walnut also much better.
Some individual trees much
worse than most. Groves
much better cared for here.
Here, bet. **Fontana Linda** and
Redland, the smaller trees
seem most affected, the
larger ones scarcely at all.

Feb. 2 - Angeles Crest Road
over San Gabriel Mts.

On Cismontane side the
lower slopes are covered principally
by adenostoma-type chaparral,
changing upward to a
mixture of scrubby *Quercus*
chrysolepis, *Q. wislizenii* (?),
Q. dumosa (?) (all three showing
great leaf variability) *Rhus*
laurina, *Rhus diversiloba*,
Photinia arbutifolia (?), *Ceanothus*
sp., etc. etc. Further
up the ravines have
Pseudotsuga macrocarpa,
Acer macrophylla, etc. The
slopes a mixture of *Ceanothus*
sp. *Arctostaphylos glauca* (?),

Eriodictyon californicum,
Brickellia californica, etc.
 No real conifers, but here
 on summit. A few *Pinus*
 coulteri (possibly planted) and
 a few *P. tuberculata* (?) (also planted), otherwise only the
Pseudotsuga in the canyons.
 Down on the north slope
 more or less the same mixture
 but, soon noticeably, there are
 more *Adenocorymbus* than
Pinus monophylla with a few
Juniperus, and *Artemisia* is
 very common.

Oct. 2 - Angeles "cut Road",
 Cismontane side,
 chaparral on steep talus below road

30658 (comp.)
 occasional

59 *Photinia* (?)

common

60 *Photinia* (?)

common

Oct. 2 - Road through a desert
 from Pear Blossom to Cajon Pass.

Above Pear Blossom (where are
 irrigated orchards) there are
 some *Ranunculus* areas, some
Yucca brevifolia, but no
 extreme desert. *Artemisia*
tridentata on upper part

Along this entire road
Eriogonum fasciculatum
 is common, but apparently
 principally in the disturbed
 ground close to the road
 rather than in the more
 undisturbed chaparral
 away from road. It is in
 bloom or just past in most
 places, at medium or upper
 elevations, brown and in fruit
 lower down on both sides. On
 the desert side the var. *polifolia*
 appears near the foot of the slope.

Artemisia tridentata runs
 well up the ravines on the
 desert side, almost as
 high as the canyon belt extends.

shrub about 0.7 m. tall, much
 branched ~~at~~ at base, flowers yellow.
 shrub, flowers dried.

shrub, fruit immature.

of alluvial slopes. The
 road climbs through a
 mixture of *Pinus mono-*
phylla, *Juniperus*, *Quercus*
turbinella, etc. varying
 locally, with some
 other shrubs (*Prunus andersonii*?)
 much *Chrysothamnus*,

etc. *Pinus coulteri* common at high altitudes, then a true coniferous forest with *Pinus ponderosa*, *Pseudotsuga*, and at 6000' and over, *Abies concolor*, *Libocedrus decurrens*, and even *Pinus contorta* var. *munayana*. This forest seems in excellent condition, many pine very well-formed, tops mostly undamaged, conical. Some pines with dark trunks, var. *geoff. jeffreyi*?

On the slope downward from Swartout the *Pinus monophylla* forests are the most luxuriant I have seen - trees up to 10 m. tall, in many places only a few feet apart. Little or no juniper. Gradually becomes more open and area gradually more covered by chaparral, the lower the altitude the more dominated by *Adenostoma*.

Toward Cajon Pass and spectacular wind eroded conglomerate - sandstone outcrops similar to, but even more spectacular than those in Mono Valley and San Fernando Valley.

Oct. 7 - Flight from Los Angeles to Denver.

Lower end of Silver Lake ~~was~~ is flooded by a thin sheet of water - reflects sun very clearly.

Also some pools in the granite lake. There must have been a heavy rain very recently.

Between Zion and Bryce Canyons the aspens show up as brilliant yellow patches. Bright red in canyon bottoms must be *Acer nigrum* var. *grandidentatum*.

Scattered patches of aspens and stream valleys filled with them to eastward. Aspens principally on east-facing slopes.

The Green River, east of Hanksville shows stupendous meanders cut in a great vertical walled gorge into an extremely desert plateau. Along the concave sides of the meanders are flats, very green, probably willows or *Populus*. Water in river is a milky green. East of this near Arches Nat. Mon. are some flat or sloping surfaces of white rock

etc.

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that are cut by joints
or bedding planes
which are filled
with trees making
striking parallel
lines, in places
cross-bedded or cross-
jointed. This is on an
enormous scale. From
a distance looks as
though it must be
artificially terraced.

In the north loop of
the Colorado, west of Grand
Junction, there is a
spectacular pattern
of gorges cut in the north
extension of Uncompaggre
Plateau. Red and
white beds exposed.

Plateau is desert.
Valley of loop above Grand
Junction irrigated and
under cultivation.

East of here the plateau
is dark with brush. The
walls of an enormous
dendritic system of canyon
cut in it are white with
some pink bedding. Small
valleys and depressions
in plateau are yellow with
aspen. This plateau is
north of the Colorado.

Grand Mesa, to south
and north main slopes
golden with aspen
where the conifers are
lacking. Spectacular
masses of color.

From here east are alternating
masses of golden aspen, red-brown
scrub, small dark areas
of conifers. Valley bottoms
are cultivated. To north
are large areas of conifers.
To south mainly deciduous,
possibly oak scrub.

Farther east, much
high bare country cut
by ravines some filled
with golden aspen, other
with pines, etc.

Then enormous forests
of solid conifers, and much
very rough high country
with patches of snow.

The forests are on lower
flanks of Mt. of the Holy Cross.
Quite a bit of snow on top.

Extensive coniferous forests
on slopes east of here.
Mountain tops grassy,
straw-color.

Front Range has extensive
grassy tops, conifer-covered
flanks, conspicuous gray scree slopes.

Oct. 5 - Auto trip - Denver - Golden - Lookout Mt. -
 Clear Creek - Idaho Springs - Chicago Creek -
 Echo Lake - Summit Lake - Mt. Evans - Summit Lake -
 Echo Lake - Squaw Pass - Bergen Park - Evergreen -
 Bear Creek - Red Rocks Park - Denver.

The lower hills are grassy or scrubby, with *Rhus trilobata* (?), *Cercocarpus*, and a heterogeneous population of *Juniperus*, varying from a green pyramidal form to a very glaucous pyramidal one, also some prostrate *Juniperus communis*. This is characteristic of sandstone hills, including the red sandstone and conglomerate beds of Red Rocks Park (these are mostly bare rock with vegetation only in cracks and on ledges, a very small *Berberis* (*Mahonia*) is very common) and granite hills and cliffs as along lower Bear Creek Canyon.

Upward, scattered pines appear, soon forming an irregular forest, as at Lookout Mt. On Lookout Mt. a gray squirrel with enormous ears was seen in the pine forest. This pines must be a form of *P. ponderosa*, but the cones are very small and the trunks vary from red to black, from platy to very rough. It is 2-needled, needles 5-8 cm. long. Mixed with this are a few spruces - apparently *Picea pungens* and *Picea engelmannii*. The pines soon change, upward, to *Pinus contorta* var. *murrayana*, which forms dense forests on ridges and open slopes, mixed with spruces in canyons. Canyon bottoms, where open, often have *Salix* and a very narrow-leaved (cont'd on p. 204)

Echo Lake 10,600 ft.

Slopes covered by dense forest of *Picea*, some *Abies*, a little *Pinus contorta* up to 20 (rarely 25-30) cm dbh. No dominant size class. Little undergrowth or ground cover, patches of *Pyrola*, *Vaccinium*. Abundant lichens (*Parmelia*) and mosses.

Bog at head of lake dominantly *Poa*, but with patches of *Salix*, some *Potentilla fruticosa*, *Sedum* common, *Gentiana* occasional, *Pedicularis* locally common. Various other herbs. 20-50 cm. of peat.

Oct. 5 Echo Lake, north slope of 10,600'
 Mt. Evans,

38661 *Pyrola*
 common in *Picea* forest
 forming patches in forest floor.

Oct 5 Mt. Evans, at timberline

38662 *Pinus flexilis*
 common in upper edges of forest
 and as isolated individuals above

depressed gnarled bush,
 2 m. tall.

Populus along streams. These are yellow to orange at this season.

Populus tremuloides comes in at about the altitude of Idaho Springs and soon become very abundant. The coniferous forest changes to almost pure spruce, the two kinds mixed. Large patches especially on slopes are covered by a pure stand of aspen, or mixed aspen and conifers. The distribution of aspen is patchy and shows no order, apparently is result of fire. There are also patches of very even aged small pine that must have resulted from fire. The aspens show a very uneven sequence of color change and loss of leaves. Those in patches on slopes have mostly lost their leaves, though an occasional small patch among conifers is a brilliant yellow, as are usually those along ravine-bottoms. Here and there is one that is a beautiful flame-pink or orange. Occasionally one is still partly green. The trunks are mostly a pale olive drab, but there are occasional areas where they are almost white.

Below 8000' the forests are largely on north-facing slopes. South ones are covered by sparse brush and Juniper. The conifer forests from 8 to 11 or 12000' are mostly spruce, with occasional fir and pine. The growth form is slender spire-like. The forests are dense and rather tall, the trees not very large in diameter. The two species of spruce are not very clearly marked here, but there are green and bluish individuals and ones with pinkish or brownish scaly bark and ones with smooth fir-like white bark. Ripe cones are abundant both on trees and on ground.

There are little undergrowth and little ground cover in this forest. Patches, occasionally of a low Vaccinium (or Salix?) that are turning yellow or red.

At timber-line, Pinus flexilis becomes abundant and in places forms a krumholz. The timber line is uneven but rather abrupt.

All through the upper forests and especially near

timber-line are spruces with dead tops.

Above timber-line the grass is straw-color and varies greatly in density. There is a rich flora of herbs mixed with it. There is a thin (10-15 cm.) layer of mor or raw humus that is rather black.

Upward the grass and other herbs get shorter till near the summit of Mt. Evans there is a very low turf, 1-6 cm. tall, still quite a mixture of species. At the summit this almost disappears, showing only on flattish spots between boulders, in crevices and in sheltered places. Summit 14,260 ft.

The virtual disappearance of vascular plants above 14000 ft. is probably due to the fact that the substratum changes almost entirely to great joint blocks and exposures of a coarse pink granite, with soil only in the pockets where the vascular plants occur.

On the rocks themselves is a small flora of crustose lichens, - black, green, bright yellow-green, yellow, and rarely orange -. The lichens are on all exposures but more abundant on the under sides of overhanging slabs and projections. Near the summit a pica was seen, also a weasel. Other picas were heard. On the slopes was a small flock of medium sized white or partly white birds. Several bright blue small birds were seen. What appeared to be a Nuttall jay was seen at timberline in the pines.

Michigan

Rocky Mountain
Bluebirds?

